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THE UNIVERSITY OF
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AN ENCYCLOPEDIC SURVEY

The University of Michigan
An Encyclopedic Survey

VOLUME I

- PART I History and Administration
PART II Organization; Services; Alumni

VOLUME II

- PART III College of Literature, Science, and the Arts—I
PART IV College of Literature, Science, and the Arts—
II; Summer Session
PART V Medical School; University Hospital; Law
School

VOLUME III

- PART VI Graduate School; Schools of Business Admin-
istration, Education, Forestry and Con-
servation, Music
PART VII College of Engineering; College of Architec-
ture and Design; College of Pharmacy;
School of Dentistry

VOLUME IV

- PART VIII Libraries; University Publications; Museums;
University Buildings
PART IX Student Life and Organizations; Athletics

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THE
UNIVERSITY OF MICHIGAN
AN ENCYCLOPEDIC SURVEY

In Four Volumes
WILFRED B. SHAW, *Editor*

VOLUME II
PARTS III, IV, AND V



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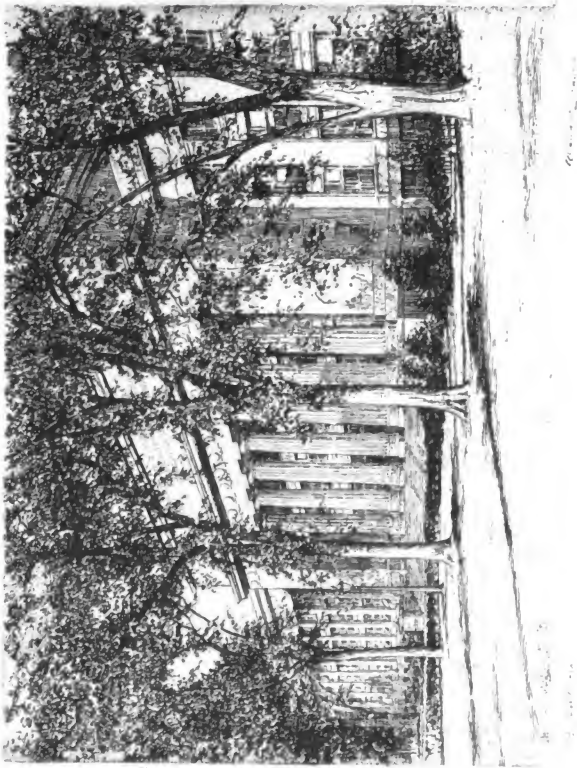
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PART III



JAMES B. ANGELL HALL

The College of Literature, Science and the Arts I

THE ADMINISTRATION AND CURRICULUMS OF THE COLLEGE OF LITERATURE, SCIENCE, AND THE ARTS

THE appointment in 1841 of the Reverend George P. Williams as Professor of Mathematics and that of the Reverend Joseph Whiting as Professor of Languages signalized the opening of the University in Ann Arbor and the birth of the Department of Literature, Science, and the Arts, which multiplied almost a thousandfold in students and more than a hundredfold in faculty within a hundred years. The curriculum offered by these two professors to the seven¹ students who first enrolled was limited to the Greek and Latin classics and to the more elementary branches of mathematics. Ten years after the first classes were conducted in Mason Hall, the number of students had grown to almost one hundred, and an additional building, now the South Wing of University Hall, had been erected to provide them with living quarters. The faculty had increased, likewise, during this first decade, until four more chairs had been filled—zoology, moral and intellectual philosophy, chemistry, and logic, rhetoric, and history. These additions to the teaching staff resulted in considerable expansion in the college curriculum and permitted the students to become acquainted with some of the newer, scientific disciplines.

The second decade of the University's existence gave evidence of the vigorous, directing hand of President Henry P. Tappan in all departments (see Part I: TAPPAN ADMINISTRATION). For no de-

partment of the University was this energetic direction more beneficial than for the Department of Literature, Science, and the Arts, as it was officially named until the year 1915. Tappan helped to bring about the introduction of a scientific course which paralleled the instruction in the classics. This "course," including work in physics, astronomy, chemistry, and civil engineering, led to the degree of bachelor of science. The inclusion of this science curriculum in the Literary Department was a departure from the precedent of Yale and Harvard, where scientific schools separate from the faculty of the humanities had been established.

President Tappan also inaugurated a greater amount of student freedom in the selection of courses than had been possible before that time. The introduction of the course leading to the bachelor of science degree provided an alternative to the customary classical curriculum. His belief that students should be permitted to pursue their individual interests led to a second alternative, an optional course which permitted a student to spend his entire time in the department of his special interest and receive at the end, not a diploma, but a certificate of proficiency. This optional course was clearly the precursor of our present permission to register as "not a candidate for a degree." The expansion of the curriculum provided a further range of choice. The student was allowed in addition to choose some of his courses during the senior year; this was the beginning of the system of free electives prevalent at the turn of the century.

¹ Farrand stated (p. 47) that there were only five freshmen and one sophomore, and gave their names. The faculty reported at the time, however, that there were six freshmen and one sophomore (*R.P.*, 1837-64, p. 212).

During President Tappan's term of office the number of students and faculty members increased rapidly. Old departments were divided, and new ones were established. The classical languages were divided into Greek and Latin; the work in philosophy was strengthened; and the number of courses in French and German, which had been begun before 1850, was tripled. The new men called to the faculty were, in general, younger scholars who were chosen wholly on their academic qualifications. It was Tappan's belief that "there is no safe guide in the appointment of professors save in the qualifications of the candidate."

After the dismissal of President Tappan, the Reverend Erastus O. Haven of Boston, a former member of the staff, was invited to accept the presidency of the University. During his six years of office the curriculum was expanded and the admission requirements were altered (see Part I: HAVEN ADMINISTRATION). A new Latin and scientific course, which substituted modern languages for Greek as cultural and disciplinary subjects, was begun and soon became popular. This course led to the degree of bachelor of philosophy, which was conferred for the first time on six students in 1870. The requirement for the optional course was defined more strictly as the passing of the examinations for admission to the freshman class. Edward Olney, who was appointed Professor of Mathematics during President Haven's administration, succeeded in having the admission requirements in mathematics increased to include a knowledge of quadratic equations.

The dismissal of President Tappan necessitated some changes in the faculty. The new appointments which were made resulted in a separation of the chairs of English and history. Moses Coit Tyler, who came as Professor of Rhetoric and English Literature in 1867, emphasized

the study of English literature more than had any of his predecessors. Charles Kendall Adams was promoted to the chair of history in the same year.

After the resignation of President Haven, Professor Henry S. Frieze was appointed Acting President and was in office for a period of two years (see Part I: FRIEZE ADMINISTRATION). During his administration women were admitted as students for the first time. The question of coeducation had been debated for many years, and in January, 1870, the Regents adopted a resolution stating that "no rule exists . . . for the exclusion of any person from the university who possesses the requisite literary and moral qualifications." By June, 1871, according to the *Catalogue*, some fourteen women had entered the Literary Department, including those in special courses.

Professor Frieze was responsible for the development of a functional relationship between the high schools of the state and the University. The University undertook to inspect the work of secondary schools and to admit graduates without the customary examination from the schools that were approved. Professor Frieze hoped that by this method the secondary schools could be so improved that they could take over the function of the German Gymnasias, and that the University could be relieved of instruction in elementary courses. The *Catalogue* of 1870-71 included the original statement of this plan of accrediting, as follows (p. 49):

Whenever the Faculty shall be satisfied that the preparatory course in any school is conducted by a sufficient number of competent instructors, and has been brought up fully to the . . . requirements, the diploma of such school, certifying that the holder has completed the preparatory course and sustained the examination in the same, shall entitle the candidate to be admitted to the University without further examination.

Acting President Frieze declined an invitation to become the next president of the University and recommended a former student of his from Brown University, James Burrill Angell, who was at that time the president of the University of Vermont. After a long period of negotiation, Dr. Angell was inaugurated in June, 1871, and began a long and distinguished career as President of the University of Michigan and as a diplomat (see Part I: ANGELL ADMINISTRATION). His first task was to fuse the separate colleges into a real university, and it was his lifelong aim to give practical expression to the theory of state education outlined by President Tappan on his coming to Ann Arbor.

The importation of the German seminar method of instruction by Charles Kendall Adams in 1871-72 signalized, as it were, the notable advances in educational policy which were to be introduced during the presidency of James B. Angell. The students enrolled in the classical and scientific courses were at first permitted to elect, according to their choice, one-third of the work of the senior year, but the degree of prescription of the course of study was gradually reduced, until in 1878-79 more than half of the courses might be elected freely. Special students who were not candidates for degrees might elect courses according to their choice throughout the entire period of study. These special students needed only to satisfy the professors of their qualifications in order to be admitted to any courses which aroused their interest.

Many other changes were introduced during this and the next year. The time necessary to complete the degree requirements was less fixed than it had been, so that the more able students might shorten the time required for the educational process or include more subjects in their course of study. The removal of the former temporal restrictions resulted in a

shift of emphasis to the number of courses which would be required for graduation. The development of the credit system came as a logical corollary of this emphasis upon the number of courses completed. The requirements for graduation were now stated as twenty-four courses for the degree of bachelor of arts and twenty-six for the degrees of bachelor of philosophy and bachelor of letters (which was introduced in 1878), each course consisting of five exercises a week or a combination of classes which would equal five exercises each week. This gradual transition exemplifies the development of the requirement of 120 hours for the bachelor's degree.

The curriculums of the Literary Department, meanwhile, were expanding rapidly. Unorganized instruction for teachers in the secondary schools had been given since President Tappan's time, but the establishment of a chair in the science and the art of teaching in 1879 was an innovation (see Part I: ANGELL ADMINISTRATION). Ten years later this department was authorized to grant certificates which qualified the possessor to teach in any high school of the state. A School of Political Science was also founded in 1881, with C. K. Adams as Dean, in which students could enroll only upon completing two years of work in the Literary Department or the equivalent of that preparation. The school did not prove popular, however, and there was no reference to it in the *Calendar* after 1890. It is of interest to note that the first course in forestry was included in this program. Courses in speech and oratory were introduced in 1884; and Thomas Trueblood became Professor of Elocution and Oratory and, in 1892, head of the first department of speech in the United States.

Graduate courses at the University were for many years included in the catalogue of the Literary Department. The

first conception of advanced work was introduced by President Tappan under the title of the "university course." This early beginning received little encouragement, however, and it was not until after the far-reaching changes of 1878-79 that real graduate work was possible. The removal of the former course restrictions and the introduction of the credit system permitted considerable expansion in the number of advanced courses, and this greater differentiation of each subject-matter field attracted more and more applicants for advanced degrees until, in 1912, the Graduate School was given a separate organic existence.

Soon after the inauguration of the credit system in 1878, a complementary program of study was planned. In 1882 the "university system" was organized, to permit unrestricted study and specialization in three fields of inquiry. The individual programs of study were approved by a special committee of the faculty. The removal of the customary restrictions for students enrolled under the "university system," however, did not initiate any alteration in the amount or quality of the work required for the degree. In fact, students applying for a degree under the "university system" were required to pass final comprehensive examinations in order to satisfy the faculty as to the adequacy of their academic work. But this alternative to the credit system did not prove popular and, although the legislation was never revoked, the program soon lost its vitality (see Part III: UNIVERSITY SYSTEM).

One further innovation which was inaugurated during President Angell's administration was a combination course in letters and medicine which permitted a student to complete the requirements for both degrees in six years. The student thus received double credit for his first year of medicine. This program encouraged prospective doctors to continue

their literary education longer than they would otherwise have done. Preliminary work in the Literary College was also stressed for those who intended to enroll in the College of Dental Surgery and in the College of Pharmacy.

During the greater portion of his administration, President Angell had charge of admissions and performed the administrative duties which have since been delegated to other executives.

The office of dean apparently evolved from the presidency of the literary faculty, which had existed before the time of President Tappan. This office, however, since it was elective within each faculty, was not recognized in the earliest catalogues. The deanship of the medical faculty was first mentioned there in 1869, when held by Abram Sager, and that of the law faculty two years later, when held by Thomas M. Cooley. In the Department of Literature, Science, and the Arts, it was not until 1875 that the annual catalogue, then called the *Calendar*, gave the title of Dean of the Faculty to Professor Henry S. Frieze. This position he held until his death in 1889, except for his two years of service as Acting President (1880-82), when Professors C. K. Adams and Edward Olney each served as Dean for one year. When Martin L. D'Ooge, Professor of Greek Language and Literature, was chosen by the faculty and officially appointed by the executive committee of the Regents, in 1890, the title was changed to dean of the Department of Literature, Science, and the Arts. Reappointed annually, he was, in effect, an assistant to the president in administrative matters pertaining to the Department of Literature, Science, and the Arts. The functions of the office were limited, in the main, to the admission of students from high school and also of those applying for admission with advanced standing (see Part II: OFFICE OF THE REGISTRAR). Richard Hudson, Pro-

fessor of History, was appointed by the Regents in 1897, without nomination by the faculty, to succeed Dean D'Ooge. The responsibilities with which Dean Hudson was charged became more manifold as the University grew and the administrative problems increased in difficulty. These new and complex problems became so numerous toward the end of President Angell's term of office that the President gave up any active participation in the affairs of the Literary Department except as presiding officer at faculty meetings. When John O. Reed, Professor of Physics, was appointed Dean in June, 1907, the administration of the Department of Literature, Science, and the Arts rested almost completely, therefore, on his shoulders.

Before 1912, admission to the College was based on preparation limited to the traditional academic subjects. No credit toward admission was granted for the newer subjects, such as manual training and home economics, which had found their way into the curriculums of the high school. In 1912 the requirements for admission were changed so that some freedom was granted to the high-school student in the subjects which he pursued as preparation for college work, but a minimum of twelve units had to be selected from the list of academic subjects. This allowed the student to pursue one-fifth of his high-school work in non-academic fields. The twelve required units consisted of three units of English, two units of a foreign language, ancient or modern, one unit of algebra, one unit of geometry, one unit of science, and four other academic units. A more radical departure from the traditional admission procedure was the arrangement whereby graduates of high schools which were members of the North Central Association of Colleges and Secondary Schools would be admitted without reference to the specific subjects that were present-

ed. This second plan of admission fell eventually into disuse and was finally eliminated altogether (see Part II: OFFICE OF THE REGISTRAR).

The reorganization of the requirements for admission was followed by alterations in the graduation requirements. Bachelor of science degrees in biology and chemistry were discontinued after 1899, until the degree in chemistry was revived in 1914. The degrees of bachelor of philosophy, bachelor of science, and bachelor of letters were awarded until 1901 to students who had pursued successfully the specialized and fixed courses of study required. In that year the four curriculums, as well as all degrees except the bachelor of arts, were abolished (the degree in science was restored in 1909), and from 1901 to 1912 the only specific graduation requirement was freshman rhetoric. The increase in the number of courses during that period made two dangers very apparent. Without guidance the student was liable to err on the side of extreme specialization or on that of a wasteful diffusion of his energy over more fields of knowledge than he could intellectually embrace. To help the student avoid these dangers, the faculty required in 1912 that a student complete twelve hours of work in each of the following groups by the end of the sophomore year:

Group I.—Ancient languages and literatures, modern languages and literature, rhetoric (other than Courses 1 and 2).

Group II.—Mathematics, astronomy, physics, chemistry, mineralogy, geology, zoology, botany, psychology.

Group III.—History, political economy and sociology, political science, philosophy, education.

To prohibit excessive specialization, the elections were limited to forty hours in any department and eighty hours in a group. As a complement to these changes the requirements for graduation were

stated as 120 hours with a satisfactory average grade.

The faculty felt that a more discriminating system of grading than "passed," "conditioned," and "not passed" would improve the standards of scholarship. The system adopted in 1912 included five grades: A—excellent, which was valued at three times as many honor points as hours of credit; B—good, valued at twice as many honor points as hours of credit; C—satisfactory, the same number of honor points as hours of credit; D—the lowest passing grade, no honor points; E—failure, deduction of hours of credit and honor points.

The combined curriculum of letters and medicine, which was introduced during the administration of President Angell, was followed by a similar course for prospective lawyers during the deanship of John O. Reed (1907–14). The principle of such combinations was extended during the term of Dean John R. Effinger (Acting Dean, 1912–15; Dean, 1915–33) to students preparing for the professions of dentistry and nursing.

President Hutchins' administration (1909–20) was characterized by an increasing complexity of the organization of the University, resulting from the physical growth of the individual colleges and schools (see Part I: HUTCHINS ADMINISTRATION). Shortly after the retirement of President Hutchins, the expansion of courses and opportunities in the field of education convinced the Regents of the University that the establishment of a separate school for training in education would be desirable. The establishment of the School of Education (1921) created difficulties for students who wished to receive a teacher's certificate and a bachelor's degree after four years of college work. The faculty of the School of Education contended that students should be enrolled in that School in order to become eligible for the certi-

ficate required for secondary-school positions. It was finally agreed, however, that students in the Literary College who had completed the technical courses for such a certificate would also be recommended for the certificate by the faculty of the School of Education.

The separate administration of the affairs of the College of Literature, Science, and the Arts, which had begun so simply with an assistant to President Angell, had expanded to such an extent that in June, 1921, during the deanship of John R. Effinger it was necessary to appoint Associate Professor Wilber R. Humphreys as Assistant Dean. Dean Humphreys was placed in charge of disciplinary action for deficiencies in class attendance and scholarship as well as of the advisory work among first-year students. These duties were increased during 1922–23 to include action on student requests to add or drop courses and disciplinary measures resulting from student dishonesty in classwork.

Several changes were made in the requirements for admission to the College during President Burton's term of office, 1920–25 (see Part I: BURTON ADMINISTRATION). The increased number of courses offered in high schools induced the faculty to decide that five of the fifteen units required for admission should be advanced studies regularly scheduled for the third and fourth year of the high-school curriculum. At the same time it was decided that the average grade which would justify recommendation for admission to the University should be distinctly higher than that required for graduation from high school. In March, 1925, the plan which permitted students to enter on recommendation of the high school without reference to specific subjects pursued was abolished. In the decade following the adoption of this resolution in 1912, only a few students had been admitted under its provisions. In

1925, the admission of freshmen was placed in the hands of the registrar of the University, subject, of course, to the regulations of the faculty of the College.

In the last years of President Burton's administration, new opportunities were made available for superior students. At the May meeting of the faculty in 1924, the Department of English and the Department of History presented plans of honors courses which would permit students of unusual capacity and ability to carry on independent work during the last year or two. During 1924-25 the interest of the faculty in honors courses was stimulated by the report of the dean on the conference on honors courses which was held at the University of Iowa. A reading course in economics for seniors was also proposed, to permit a small group to correlate their study and reading in economics and its allied fields. During the next year, a similar reading course in sociology was authorized for selected students.

The privilege of condensing the work for the bachelor of arts degree by means of a combined course of study was extended (1924) to students preparing for postgraduate study in the School of Business Administration.

The proliferation of departments of the College continued throughout the administrations of President Burton and of President Little (see Part I: *LITTLE ADMINISTRATION*). In 1923-24 the Department of Geology was divided into the separate units of geology and geography. During the next year a new department of instruction, the Department of Library Science, which had been authorized by the Regents, was included in the scope of the College by unanimous vote of the faculty. Students entering this curriculum were required to have ninety hours of college work with an average of 1.33 honor points per credit hour and a reading knowledge of two foreign languages.

From the foregoing description of the development of the instructional facilities of the University it should be evident that most of the separate professional schools and colleges began as chairs of instruction within the Literary Department, and that, as their subject matter became more complex and as they became of greater importance to the development of the commonwealth, they finally were established as independent units of the University. Classes in pharmaceutical chemistry were added to the curriculum of the Department of Chemistry in 1868. The demand for this instruction in the training of prospective pharmacists increased rapidly until the School of Pharmacy was established as a separate unit of the University in 1876 under Albert B. Prescott, the Dean. The School improved the quality of its instruction in this very essential professional field until it was recognized as one of the foremost in the country.

Postgraduate education at the University has, since its inception, been intimately associated with instruction in the undergraduate college. This relationship between the two types of instruction is one which must be expected to continue, inasmuch as the same professor will give courses in elementary physics and in research and electronics. There was very little graduate study carried on at the University prior to 1878, except in the Departments of Chemistry and Astronomy. In 1892 graduate instruction was placed under the control of an administrative council, chosen from the faculty of liberal arts. Training for advanced degrees was thus included as a part of the instructional program of this department until 1912, when the Graduate School was established, and Professor Karl E. Guthe, who had been Professor of Physics, was appointed the first Dean. This separate existence of the Graduate School recognized the increase in graduate work

by students enrolled in other schools and colleges of the University.

Courses for the training of engineers had been part of the instructional program of the University from the beginning. The chair of civil engineering and drawing was authorized in the constitutional articles providing for the establishment of the University. Instruction in these subjects was not given immediately, however, and it was not until 1853 that Alexander Winchell was appointed Professor of Physics and Civil Engineering. The greatest expansion of the curriculum for prospective engineers came somewhat later. In 1872 Charles Ezra Greene was appointed Professor of Civil Engineering, and, with the help of two other staff members, began the diversification of opportunities for technical training within the department. Although mechanical and electrical engineering courses were soon added, it was not until 1895 that the Regents established the separate Department (later College) of Engineering with Professor Charles E. Greene as Dean.

After the abandonment of the first courses in forestry in 1885, when the School of Political Science began to decline, students interested in forestry elected nonspecialized courses in botany until 1902. A forestry course was then given in the Department of Botany, and a year later the Department of Forestry was established, with Filibert Roth as Professor. These courses were continued in conjunction with certain work in the Department of Botany, until the interest in conservation of timber resources of the state and country required the establishment of a separate unit of the University. In the fall of 1927, the Regents established the School of Forestry and Conservation and appointed Samuel T. Dana as its first Dean.

Courses in business administration had been conducted in the Department

of Economics for some time. These courses were organized as a special curriculum in the department, and the student, upon their completion, was granted a special certificate in business administration. It became more and more evident, however, that the aims of pure economics and of applied economics were very different, so that the special curriculum became essentially a school of business administration in the fall of 1924. Edmund E. Day became the first Dean.

Many routine changes were made in the organization of the departments of the College during the next three or four years. In 1927-28 the faculty agreed that the Departments of English, Rhetoric, and Speech should co-ordinate their several activities in order that a unified freshman course, which included both composition and literature, might be developed to replace the former course in rhetoric. Instruction in anthropology was offered for the first time in the second semester of 1923-24, by Colonel Thomas C. Hodson, of London, England. The Department of Anthropology was established in 1928, when an introductory course was offered jointly by Dr. Carl E. Guthe, Director of the Museum of Anthropology, and Mr. Julian H. Steward, Instructor. During 1928-29 the scholarship requirement for the combined course of letters and library science was increased to one and one-half honor points per credit hour. In addition to this factor of selection, the students enrolling in this course were required to present the degree of bachelor of arts or that of bachelor of science. Another combined course was approved by the faculty in addition to those already in existence, providing preprofessional training for students who planned to transfer to the School of Forestry and Conservation. On the death of Professor Robert M. Wenley (1929), the courses in philosophy and psychology were separated, and the staff

was divided into two separate departments. The courses in composition which were particularly appropriate to training in journalism were separated from the other courses in the Department of Rhetoric, in order to establish the Department of Journalism. In 1929-30 the Department of Rhetoric and the Department of English were combined, and in that same year the Department of Economics and Sociology was divided.

Certain revisions of the organization of the College and of the curriculum had been considered by the faculty in 1925-26 upon the recommendation of President C. C. Little. These discussions continued for several years and culminated in 1930-31 in the establishment of a program of concentrated study during the last two years of college—one of the most significant alterations in the educational program of the College of Literature, Science, and the Arts since its establishment. The faculty was primarily concerned with the proposal to divide the four-year course into an upper and lower division or a junior college and a senior college. In May, 1931, the faculty committee recommended the adoption of a plan of concentration for the junior and senior years, and recommended further that the inauguration of this plan be postponed until the reorganization of the work of the first two years had been completed. The discussion continued at intervals during the next two or three years, and eventually it was decided that the first two years toward the bachelor's degree should consist of a general program of liberal arts courses and that a somewhat more specific degree program in a field of concentrated study should occupy the next two years. The caliber of the students who would be admitted to a degree or concentration program was assured by the regulation that a student must have completed sixty hours of college work prior to admission and must

have attained at least an average of C in all of that work. Similarly, during the last two years the student must have completed sixty hours of course work with an average grade of C in order to qualify for a degree. The department chosen by the student as his field of concentrated study was permitted to specify the courses which should be pursued during one-half of the final sixty hours of college work. It was also possible, at first, for a student to concentrate in a group, in which case sixty hours, or the entire last two years, might be specified. These programs, in addition to the English composition and group requirements, became the requirements for graduation.

In order to achieve the desires of the curriculum committee it was necessary to appoint a large number of the faculty as advisers to students concentrating in particular departments. Underclassmen who were not yet eligible for the work of the last two years were advised by a group of special, paid counselors who served throughout the year, under the general authority of the Office of the Dean. The advisers during the last two years were of necessity chosen by the department in which the student wished to study. This entire plan, including as it did a fundamental alteration in the undergraduate instruction of the Literary College, affected students entering the College in September of 1931 and all subsequent classes.

On June 7, 1933, Dean John R. Effinger, after twenty-one years of conscientious leadership, died very suddenly of a heart attack. The necessity of selecting a new head of the College provided an opportunity for reorganizing administrative and departmental functions. A temporary executive committee was appointed from a panel chosen from the faculty of the College of Literature, Science, and the Arts, to perform the duties and exercise the authority of a dean

until the appointment of a successor to Dean Effinger. The membership of this temporary committee was as follows: Professors D. H. Parker, M. Gombert, L. C. Karpinski, J. R. Hayden, and E. H. Kraus, chairman.

The terms of a permanent organization of the administration of the College, adopted by the Regents in September, 1933, may be summarized as follows: The executive functions of the College of Literature, Science, and the Arts were placed under the control of the dean assisted by an executive committee of six members appointed by the president from a panel selected by the faculty. The executive committee was charged with the duties of investigating and formulating educational and instructional policies for consideration by the faculty, and of acting for the College in matters of budget, promotion, and appointment. Edward H. Kraus, Professor of Mineralogy and formerly Dean of the Summer Session and of the College of Pharmacy, was appointed Dean of the College of Literature, Science, and the Arts in August, 1933, with the first executive committee to be appointed under the terms of this new organization—Professors J. W. Bradshaw, J. S. Reeves, A. E. R. Boak, D. H. Parker, W. H. Hobbs, and I. L. Sharfman.

The requirements for admission to the College of Literature, Science, and the Arts adopted by the faculty and the Regents in 1912 continued essentially unaltered until 1933-34. In view of the experimentation which was being carried on at various institutions throughout the country, it was thought advisable at this time to appoint a committee to study the question of college admissions and to present a report to the executive committee and to the faculty. The most significant feature of the plan presented by the committee was that the student seeking admission be permitted to present work in

groups; that is, that the fields of study in related subdivisions be grouped together so that physics might be counted in the same group with mathematics, and economics in the same group with history. There are in all five groups—English, foreign language, mathematics, science, and social studies. Of the fifteen units required for admission, ten must be presented from these five groups in the following manner: two subject-matter sequences of three years' work each, and two such sequences of two years' work each, foreign language being the only group in which more than one sequence is allowed. This plan, which permitted somewhat greater flexibility in the matter of choice of subjects by high-school students, was approved by the faculty on November 26, 1934, and was ratified by the Regents in December, 1934.

During 1934-35 the executive committee presented to the faculty recommendations for the administrative reorganization of the departments of the College. During the course of the year each department considered the question of its administrative organization. The various plans of departmental organization may be placed in three groups:

1. Those continuing the informal arrangement under which they had been operating.
2. Those adopting a partly elective and partly appointive executive committee.
3. Those in which the whole staff, or those of higher rank, form a deliberative committee.

For some years the scholastic standard for admission to the various combined curriculums had remained 1.5 honor points per hour of credit, but there was a growing opinion that the minimum scholastic level for admission should be somewhat advanced. This feeling received strong corroboration when it was reported that the scholastic average of the graduating class of 1934 was 1.64 honor points

per credit hour earned in residence. A committee was asked, therefore, to consider the problem, and in a report to the executive committee, two major changes were recommended: (1) that the scholastic average of the students who wished to enroll in these curriculums must be 1.75 honor points per credit hour, and (2) that such students be urged to spend two years in the College of Literature, Science, and the Arts of the University before transferring to a program of professional training. This report, which was discussed by the executive committee in conjunction with the deans of the professional schools with which such curricular arrangements were operative, was adopted by the faculty in April, 1935, and was later approved by the Regents of the University. The plan became effective for students entering upon these curriculums in the fall of 1938.

The degree programs committee, appointed by the executive committee in December of 1934, presented during the academic year 1935-36 a plan for reorganization and adjustment of the degree programs of the College of Literature, Science, and the Arts. The changes in policy which the committee believed to be advisable were steps in the direction of (a) improvement in the advisory system, the weaknesses of which were apparent to both students and faculty, (b) cultivation of those fields of endeavor which should enter into the training of every student regardless of his major interests, (c) elimination of concentration so diffuse as to belie its name, and (d) an increase in the student's co-ordination and organization of his knowledge as an antidote to the unrelatedness of separate courses.

Of the five resolutions which were proposed by the committee for consideration by the faculty, the following four were approved by vote of the faculty, with some slight alterations. The form in

which they were adopted was as follows:

A. Resolved,

1. That the Executive Committee of the College be requested to select, with the concurrence of the departments from which they may be drawn, a unified and enlarged group of academic counselors for the freshman and sophomore years, such counselors to be of academic rank and to be paid, or compensated by reduced teaching load, as early as budget conditions permit; and

2. That, for further study of the functions of the concentration plan and particularly of the advisory system, the Dean, with the advice of the Executive Committee, be requested either (a) to continue the present committee, or (b) to appoint a separate committee, or (c) to create a standing committee, such committee to report to the faculty with recommendations.

B. Resolved,

1. That no student shall be admitted to concentration before satisfying the requirements in English composition;

2. That defective use of English by students be reported by members of the faculty to a faculty representative designated by the Department of English Language and Literature, and that the present regulations on page 39 of the 1935-1936 Announcement be accordingly amended; and

3. That the Dean be requested to send at an appropriate time in each semester a notice to all members of the college faculty in charge of courses, calling attention to the provisions relating to defective use of English.

C. Resolved,

1. That concentration in Groups I, II, and III be abolished;

2. That "Science and Mathematics" be constituted a field of concentration, in which 60 hours would be controlled by the committee administering it; and

3. That pending further action, Social Studies be recognized as a field of concentration open to students preparing for the Teacher's Certificate, the program in this

field to be administered by the committee on the Teacher's Certificate.

D. Resolved,

1. That any department or committee in charge of a field of concentration be authorized, at its discretion, to require of any or all students concentrating in that department, or in that field, a comprehensive examination as a prerequisite to graduation, and, further, that it be authorized to grant credit not to exceed six hours on the basis of this examination, such examination to be elected by the student as part of the work of the semester or year in which it is taken.

2. These alterations in the regulations governing the program of concentrated study go into effect immediately unless otherwise stated in the report of the committee.

The need of freshman and sophomore students for advice upon academic matters has become more pressing each year since the introduction of the program of concentrated study during the last two years of the college course. The number of academic counselors who have been chosen to advise these students concerning their academic problems has been increased, until in 1939-40 ten members of the staff were engaged in this very important adjunct to classroom instruction. Two counselors have been assigned the problems of sophomore students who have made poor scholastic records. These students are warned against the danger of attempting to fulfill the exactions of the customary number of hours of academic work and of simultaneous outside employment. The problems of the adjustment of entering freshmen to the conditions of college life are assigned to the other six counselors. It is impossible, however, for six members of the staff, in the small amount of time at their disposal, to solve the problems of twelve hundred freshman students. At the present time it is necessary for the counselors to both freshmen and sophomores to concentrate their efforts upon the scholastic

difficulties of the students. It is hoped that the number of these advisers may be increased in the near future in order that some of the emotional and personality factors contributing to academic failure may be eliminated. The advice and counsel of these members of the College staff is greatly appreciated by the students as well as by their parents.

At a meeting of the faculty in December, 1936, the method of computing the numerical equivalents for the various letter grades was altered in accordance with the following resolution:

Be it Resolved: 1. That the hours of E grade received by students in the College of Literature, Science, and the Arts be included in the calculation of the point-hour ratio.

2. That the point equivalents for the several letter grades for the College of Literature, Science, and the Arts be as follows:

A = 4, B = 3, C = 2, D = 1, E = 0.

These resolutions concerning the marking system will become effective for freshmen entering the College in the fall of 1937 and for all subsequent classes. Students admitted with advanced standing who expect to graduate in 1941 and thereafter will consequently be graded on this system. To prevent confusion, however, the marking system on a student's record shall not be altered during his residence at the University.

At the first meeting of the faculty in 1937, a resolution was carried which would make it possible to excuse students from the second semester of English composition if their first semester grades had been either B or A and their other grades C or above. The approval of this resolution indicates an emphasis upon achievement in written English rather than the mere completion of a certain number of course hours.

The conclusion of a century of life in Ann Arbor in June, 1937, brought to partial fulfillment the continuous growth and progress of the College of Literature, Science, and the Arts. At the present

time, with a student body of approximately five thousand and a faculty numbering more than three hundred, the College has attained a position of eminence and honor among the institutions of higher education in the country. The contribution by the faculty to the sum of human knowledge continues each year through the publication of significant articles and books. While the College has not been always the first in the country to adopt new procedures, it has been often among the first to approve new departures which have become a perma-

nent part of undergraduate instruction. The program of concentrated study during the last two years of college is being integrated gradually into the academic life of the institution. The gratifying results of the reorganization of the College so that its administration is carried on by the dean and an executive committee, and the more democratic conduct of the affairs of the departments of the College, indicate a dynamic future and a continuing contribution to higher education.

EDWARD H. KRAUS
LLOYD S. WOODBURN

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THE UNIVERSITY SYSTEM

IN June of 1881, the Regents authorized a School of Political Science—a two-year course for upperclassmen and graduates. This school was suggested by Thomas McIntyre Cooley and was begun in September, 1881, under the deanship of Charles Kendall Adams, who had recently returned from Germany. The student was permitted to study in related fields with much greater freedom than had been previously possible.

The relationship of this school with the rest of the Department of Literature, Science, and the Arts was considered by the faculty from December, 1881, until May, 1882, when the faculty agreed upon a compromise plan for a small number of students in the Literary Department. This plan, which was known as the "university system," did not require a student to complete a fixed number of courses, but permitted him, under the direction of a faculty committee, to take a large amount of work in a limited range of studies, and required him to write a searching examination at the end of four years. If his examination were satisfactory, he would be granted the degree of bachelor of arts. If the student were able to write a brilliant examination and to present a meritorious thesis, he might be granted the degree of master of arts. Women were included in this plan during its first year of operation.

The student who elected this university system ordinarily selected three related lines of study and arranged his courses subject to the approval of a committee of professors. This work consisted entirely of the election of regular courses within a small range of the academic subjects and represented a degree of specialization which was otherwise impossible. The instructions to a student frequently

indicated three groups of courses. The first group was to be completed as if he were working under the credit system, with all the regular course requirements and the final examinations. The courses in the second group were to be attended and as much benefit derived from them as possible without formal election. In the courses of the third group the student was to browse as time permitted.

It is evident from an examination of the historical records that the adoption of this plan was preceded by a detailed consideration of how to carry on true university work without additional preparatory work during the first two years. It would seem, therefore, that the introduction of this system was intended to provide the line of division between preparatory and university work which has so long been a distinguishing characteristic of German education.

During the two-year period 1883-85 the university system expanded very considerably, until there were in all nine fields in which students might specialize under this program. The names of these fields, with the chairmen of the various committees, are as follows:

Greek and ancient languages—Martin L. D'Ooge

German—Edward L. Walter

English literature—Isaac N. Demmon

History and political economy—Charles K. Adams

Philosophy and the fine arts—William H. Payne and George S. Morris

Chemistry and related fields—William H. Pettee

Geology—Alexander Winchell

Mathematics—Wooster W. Beman

Astronomy—Mark W. Harrington

Contrary to the implication of the speech of President Frank Aydelotte of

Swarthmore College in the spring of 1936, the university system was not an early attempt at honors work in the sense in which this has been adopted at Swarthmore and other colleges throughout the country. The program was, it is true, only for the abler students, but it provided for no independent work or reading. A full course program was sometimes outlined for two years in advance. There was, in fact, almost no one on the staff at that time who knew the meaning of reading for honors as it has been practiced at Oxford and Cambridge universities for centuries.

During the years when the university system was under consideration, the faculty was also discussing the qualifications for the various doctor's degrees which should be granted by the University. Inasmuch as there was at that time no graduate school, the university system and the work for advanced degrees became inextricably bound together, and the Registrar's Office records indicate that as early as 1883 there were graduate as well as undergraduate students enrolled under the university system. By 1885 or 1886, the number of graduate students who were enrolled in the university system was equal to that of the undergraduates, and within a year had exceeded the number of undergraduate students. The records for 1887-88 were labeled:

- 1—Graduation on the University System
- 2—Higher degrees on the University System

Subsequent to 1888, the number of undergraduate students enrolled in the university system comprised a very small proportion of the total. During 1889-90, the records were labeled: "University System and Advanced Degrees; The Last of the Group Arrangement, Decentralization."

This statement of fact, appearing without any explanation on the records of the Registrar's Office for that year, would be difficult to understand, were it not for the action of the faculty taken on June 2, 1890. This action named the professor of the department in which the major study fell as chairman of the committee for advanced degrees, the committee to be composed of professors and assistant professors who instructed the candidate. At least three members were required for committees on advanced degrees.

This method of constituting the committees for advanced degrees eliminated the need for the university system in graduate work. The numbers of students who enrolled and graduated in three representative years of this decade were as follows:

	Enrolled	Graduated
1883-84	18	11
1887-88	16	13
1890-91	3	3

Shortly after the end of this decade, the university system ceased to exist as a vital part of the work of the Literary Department, although the possibility of study on this program was not revoked until after 1900, and occasionally students graduated under its provisions until that date.

A list of students who studied under this plan contains the names of many who later attained prominence. Among these are Ernest Sutherland Bates, Claude Van Tyne, Fred N. Scott, E. R. Sunderland, and Aldred S. Warthin. It is very evident from letters of alumni that this program provided "two years of the richest experience in intimate contact with . . . great men that a young man could possibly realize."

LOYD S. WOODBURN

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THE DEPARTMENT OF ANTHROPOLOGY

DURING the early 1920's, the desirability of offering instruction in anthropology, the need for which had been recognized for a number of years, was made more apparent by the increased interest in the anthropological collections of the University (see Part VIII: MUSEUM OF ANTHROPOLOGY). This led, in 1923, to the offer of a nonresident lectureship in anthropology to Colonel Thomas Callan Hodson, of London, England. As a result of his acceptance, regular courses in the subject were given in the College of Literature, Science, and the Arts for the first time during the second semester of the school year 1923-24. Colonel Hodson, who had enjoyed special opportunities for research in comparative religions while serving as a member of the Indian Civil Service for many years, offered three courses. The enrollment in these indicated the interest in the subject and the advisability of making permanent arrangements for instruction in anthropology.

In the years which followed, attempts were made, without success, to find a professor of anthropology and to organize a regular department. It was finally decided to begin modestly by appointing an instructor in the subject and to develop the work gradually, with the active co-

operation of the officials of the recently established Museum of Anthropology. Late in the spring of 1928, a Department of Anthropology was created in the College of Literature, Science, and the Arts, and Dean Effinger was authorized to appoint an advisory committee to supervise its activities. The work of this committee led to the appointment, on October 1, 1928, of Julian H. Steward (Cornell '25, Ph.D. California '29), then a doctoral candidate in anthropology at the University of California, as Part-time Lecturer in Anthropology and Part-time Curator in the Museum of Anthropology. Mr. Steward and Carl Eugen Guthe ('14, Ph.D. Harvard '17), Director of the Museum of Anthropology, jointly offered an introductory course in the subject during the school year 1928-29. Although the course was organized too late to be included in the *Announcement* for that year, it had an enrollment of seventy-three students.

Having received his doctorate in June, 1929, Steward resigned his position in the Museum of Anthropology in September, 1929, to devote his full time to an instructorship in the College. During the school year 1929-30, a full-year introductory course was given by Steward and Guthe, who held a lectureship in

the department. In addition, Dr. Steward taught three one-semester advanced courses, and conducted a seminar in primitive culture each semester. An individual research course enabled qualified students to take advantage of the library and museum facilities.

In the spring of 1930 Steward resigned to accept a position at the University of Utah and was succeeded by Leslie A. White (Columbia '23, Ph.D. Chicago '27), formerly of the University of Buffalo, who was appointed to an assistant professorship of anthropology in June, 1930. The courses offered in the next school year were essentially the same as those offered the previous year.

During the ensuing years, the department has grown steadily. All of the courses in anthropology were open only to upperclassmen and graduate students until 1936-37, when the full-year introductory course was opened to sophomores. That same year a survey course was established to meet the needs of upperclassmen and graduate students concentrating in other fields. In the fall of 1930, an assistantship was established in the department, and in June, 1932, White was advanced to the rank of associate professor. In November, 1935, Mischa Titiev (Harvard '23, Ph.D. *ibid.* '35) was appointed as an instructor in the department. Dr. Guthe has continued to teach one or two courses as a part-time lecturer. During this period White gradually assumed full responsibilities as the

acting chairman of the department.

In the school year 1930-31, the department offered eighteen semester hours of courses, including the full-year introductory course open only to upperclassmen, and a course in research and special work each semester. In 1937-38, thirty-seven semester hours were offered, including the full-year introductory course now open to sophomores, and two courses each semester in research and special work, one in the department and the other in the Museum of Anthropology. The enrollment increased from 250 in 1930-31 to 553 in 1936-37. Regular summer session courses in anthropology were offered for the first time in the summer of 1937. Extension courses in anthropology have been given for a number of years in Detroit, Saginaw, and Pontiac.

The department is still young, but it is well established, due in no small measure to the cordial welcome it has received from the faculties of its sister departments. As yet, it is not possible to offer a full complement of courses in all the fields of anthropology. The interests and energy of the present small staff lead to an emphasis upon theoretical anthropology of the American Indian. As opportunity offers, it is planned to add courses in ethnography, comparative linguistics, archaeology, technology, and, possibly, physical anthropology. The present offerings allow students to obtain a master's degree in the subject.

CARL E. GUTHE

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THE DEPARTMENT OF ASTRONOMY

THE Department of Astronomy at the University of Michigan has a long and honorable record. A professorship of astronomy, "*didaxia of astronomia*," was among the thirteen "*didaxiim*," proposed in the Act of 1817 establishing "the catholepistemiad, or university, of Michigania." A professorship of natural philosophy, a subject under which astronomy has an important place, was provided for in Ann Arbor in 1837. In the first published announcement of the University in 1843-44, George Palmer Williams, one of the two members of the original faculty, appeared as Professor of Natural Philosophy and Mathematics.

Winfield Smith ('46, A.M. '49) reported that in the beginning no science was taught "except Mathematics by Professor Williams," but in the first *Catalogue*, under the general heading "Mathematical and Scientific Studies," Davison Olmsted's *Astronomy*, an American text first published in 1839, was listed with the work required of juniors. In the *Catalogue* of 1844-45 astronomy was first listed as a separate subject; it was given in the third term of the junior year. Members of the class of 1849, a half-century after graduation, boasted that they were "the boys who calculated eclipses of the moon from the desk of Williams, the Paternal." His biographer, the Honorable James V. Campbell, said that Williams excelled as a teacher of astronomy and in spite of meager appliances excited much enthusiasm in that pursuit. As early as 1849 the Board of Regents made an official plea for astronomical instruments.

When the University's teaching program was completely revamped in 1852-53 at the opening of the Tappan administration, astronomical studies were given

particular emphasis (see Part I: TAPPAN ADMINISTRATION). A scientific curriculum leading to the bachelor of science degree was introduced parallel with the classical course, and advanced undergraduate and graduate studies were attempted. The new scheme would, it was announced, "require the erection of an Observatory, a large increase of our library and our philosophical apparatus, and additional Professors." Astronomy was listed in the scientific course and also among the graduate subjects, but there was a blank beneath the title "Professor of Astronomy and Civil Engineering," and it was explained that both subjects were temporarily included, so far as was practicable, in the study of mathematics.

Immediately after Tappan's inauguration a special fund for the Astronomical Observatory was begun. It grew with surprising rapidity, and the Observatory became the outward and visible indication that the new instructional program was under way. In the course of the year the architect was authorized to draw up the plans, and the President arranged for the construction of astronomical instruments in New York and Berlin. (A separate account of the acquisition of physical properties for astronomical instruction and research at the University, including lands, buildings, and equipment, is given in Part III: ASTRONOMICAL OBSERVATORIES AT ANN ARBOR.)

President Tappan offered the position of professor of astronomy and director of the Observatory first to Professor W. A. Norton of Yale College and then to Dr. B. A. Gould of Boston, but both declined. In the course of these negotiations Professor Haven called the President's attention to Professor Alexander Winchell, of the University of Alabama,

and vouched for his ability to manage the astronomical program as well as to teach the natural and physical sciences and engineering. Winchell was engaged to come in January, 1854, as Professor of Physics and Civil Engineering, however, and the search for an astronomer continued.

The President was in correspondence at the time with Dr. Franz F. E. Brünnow of Berlin, who, with Professor J. F. Encke, was supervising the construction of astronomical instruments for the University. Brünnow expressed his enthusiastic admiration of the meridian circle and said he would envy the astronomer who would have the good fortune to use it. Tappan conceived the idea of bringing him to Michigan. He consulted American astronomers, and they bore unanimous testimony to Brünnow's eminent qualifications. Gould, however, advised against the appointment because he doubted the wisdom of engaging foreign professors to teach in American universities. Tappan ruled otherwise. He claimed that "the republic of letters overleaps national boundaries," and that if the growth of a finer native scholarship could be fostered by the importation of an eminent foreigner "even a peculiar national interest" would be served. Moreover, because the Observatory ranked high in the perfection of its instruments, its management would require a master hand.

Franz Friedrich Ernst Brünnow (Ph.D. Berlin '43) was thirty-three at the time he was offered the position of Professor of Astronomy and Director of the Observatory at Ann Arbor in 1854. He was a native of Berlin, and the son of a privy councilor of state. In the University of Berlin he was the favorite pupil of Encke and one of the notable group—including Galle, Bremiker, and D'Arrest—that had gathered about that great astronomer. He was present when Nep-

tune was first recognized, and his notification of its discovery was one of the first to reach England. After serving as assistant to Encke in the Royal Observatory of Berlin he was in 1847 appointed Director of Bilk Observatory, near Düsseldorf, and in 1851 he returned to the Royal Observatory, succeeding Galle as First Assistant to the Director. In the meantime (1848) he published his *Mémoire sur la comète de Vico*, which brought him the gold medal of the Royal Institute of the Netherlands. He had contributed papers on the orbits of minor planets and comets to the *Astronomische Nachrichten*, and was the first astronomer to calculate the tables of the asteroids. Humboldt was greatly interested in his career; he urged Brünnow to accept the Michigan offer and looked forward to the contributions he would make in the New World.

The young man's acceptance, according to rumor perhaps apocryphal, was stimulated by a desire to escape personal pursuit. Encke had three daughters, who were fine girls and excellent *hausfrauen*, but they unfortunately lacked personal beauty. Encke's attachment for Brünnow extended to a desire to have him for a son-in-law. The wilds of the New World offered Brünnow a means of escape; but he later became the son-in-law of President Tappan.

Brünnow reached Ann Arbor in July, 1854. That fall, as the *Catalogue* of 1854-55 announced, the Observatory building was completed, the transit mounted, and the astronomer had begun his observations. A higher, or "university," course in astronomy was added to the curriculum, and the Observatory instruments were available to students prepared to use them.

But though Brünnow's arrival had been much heralded, his introduction to Ann Arbor was not free from embarrassment. Attacks on President Tappan's

"Prussianism" became more pointed. The *Detroit Free Press* commented that the Regents had brought an assistant from the "Royal Observatory of Prussia" to take charge of the "Royal Observatory at Ann Arbor" (Perry, p. 206). Students complained that they could not understand Brünnow's lectures. Apparently undisturbed, he quietly proceeded with his work.

When the Walker meridian circle arrived from Berlin in September, 1854, he tested it for systematic errors, and, according to one reviewer, his published table of corrections for this instrument, computed for every fifth degree in position, is perhaps not to be surpassed for thoroughness by anything similar in the whole range of astronomical literature. The sidereal clock and other instruments were installed, but serious difficulties were encountered in the construction and installation of the large telescope from New York—first a long delay, then the temporary use of a loaned instrument, the rejection of the telescope when delivered, revision of the contract, and finally, in March, 1856, a new campaign for funds.

Brünnow soon attacked the problem of "raising up native astronomers," in accordance with President Tappan's expectations. Although an American astronomer needed systematic training in which higher courses in theory should be correlated with practice in the use of instruments under expert guidance, such training was not provided by the only other observatories in the United States that had comparable equipment—Washington, Cincinnati, and Harvard.

At the University of Michigan the basic undergraduate course in astronomy was given early in the junior year. As a senior the student might enroll upon a two-year program of advanced study, which was only briefly referred to in the *Catalogue* during Brünnow's first two

years at Michigan, but was announced in some detail for the year 1856-57:

1. An introductory course, with general regard to the History of Astronomy.
2. Spherical Astronomy and theory of the instruments.
3. Calculation of orbits of the celestial bodies.
4. Numerical calculus; theory of intergrolutions; evolution of differentials and integrals from a series of numerical values; method of the least squares.
5. Physical Astronomy; calculation of special and general perturbations of the heavenly bodies.

(The fact that "intergrolutions" for "interpolations" could appear in print, in the description of Course 4, is an interesting side light on the newness and strangeness of the subjects treated, and perhaps also on the unfamiliar script of Brünnow.)

His *Lehrbuch der sphärischen Astronomie* had won wide acceptance and had been translated into French, Russian, Italian, and Spanish, and his *Tables of Flora* was published in Berlin in 1855. His professional ability, already established in Europe, was soon recognized in America and helped bring the University of Michigan a reputation for scientific achievement.

As early as March, 1857, Cleveland Abbe wrote to "every astronomer in the country," inquiring about courses of study in astronomy and practice with astronomical instruments, and was told to study in Ann Arbor if he could not go to one of the famous European universities. According to Robert S. Woodward it was Brünnow who introduced in America before 1860 the methods of "the illustrious Gauss and the incomparable Bessel," the German astronomers who laid the foundation of modern spherical and observational astronomy. From Brünnow are descended directly some of the most distinguished American astronomers.

His influence upon American scholarship has been compared by Professor Castle of Harvard to that of Agassiz. J. McKeen Cattell has also noted the parallel:

... At nearly the same time Agassiz came from abroad to Harvard and Brünnow to Michigan. We all know the list of distinguished naturalists trained under Agassiz ... From Michigan have come, as is not so well known, one-fourth of our distinguished astronomers. (Quoted in *Mich. Alum.*, 22 [1915]: 6.)

The University has always honored and maintained the tradition, established in Brünnow's administration, that training future astronomers is one of the principal functions of the professor of astronomy and director of the Observatory.

But although gifted students were attracted and the lectures were of high quality, the enrollment was not large. In one course Brünnow lectured to a single student. When he was asked, "Why do you devote so much time to so small a class?" he replied, "That class consists of Watson." Later events showed that his high estimate of this particular student was fully justified. Professor Andrew D. White years afterward remarked, "The best audience any professor ever had in this University was the audience of Dr. Brünnow when he was lecturing to his single pupil, Watson" (Adams, p. 13).

James Craig Watson ('57, Ph.D. Leipzig '70, LL.D. Columbia '77) was born in Ontario in 1838. When he enrolled in the University as a freshman in 1853 his home address was Scio, in the township west of Ann Arbor. He obtained the bachelor's degree at the age of nineteen. During his undergraduate days he mastered Laplace's *Mécanique céleste*, translated Precht's *Praktische Dioptrik*, and made a four-inch achromatic telescope. Precht's work contained instructions for grinding, polishing, and mounting such an instrument, but it appears from Watson's student notebook that he had also

appealed directly to Henry Fitz of New York, maker of the large telescope for the University, and had received a letter from Fitz containing instructions for the process. Watson's notebook gives evidence of thorough training in mechanics, optics, and astronomy at the University.

Brünnow was the teacher not only of Watson, but also of Cleveland Abbe (College of the City of New York '57, Ph.D. *ibid.* '95, LL.D. Michigan '88), founder of the United States Signal Service, of Orlando B. Wheeler (A.B. and B.S. '62, C.E. hon. '79), and of Asaph Hall, Sr., who discovered the two satellites of Mars and whose son was in charge of the Department of Astronomy from 1892 to 1905.

In addition to his scientific achievements, Brünnow's quiet simplicity, fine spirit, and musical accomplishments won many friends on the faculty and caused those "who knew him best to love him most." Nevertheless, his administration was full of difficulties. The antagonism aroused against "Prussianism" in the University continued in the form of merciless but largely anonymous criticism of the President and Brünnow. The Observatory drained money from the fund faster than it could be obtained from subscribers, and as early as 1856 the Observatory debt was a source of serious annoyance. The young astronomer's interests were even more closely allied with those of the President by his marriage in 1857 to Rebecca Lloyd Tappan, the President's daughter; his trip to Europe, for which he obtained a leave of absence from March to October of that year, is referred to in Alexander Winchell's journal as his "wedding tour." While in Berlin Brünnow may have confided to his old friend Humboldt his difficulties as to the Observatory, for in a letter dated May 4, 1857, to the *New York Evening Post*, Humboldt wrote:

The supreme direction of an institute

worthy of the States which move at the head of the civilization of the New World cannot be entrusted to more worthy hands. Attached heart and soul, like myself, to the prosperity, the grandeur, to the intellectual progress of your noble country, Mr. Brünnow will justify the sympathies solicited through your support. . . . (Winchell, MS, "Scrapbook," I: 2.)

Not until November, 1857, just after his return, was the large telescope by Fitz finally received and accepted as satisfactory; it was ready for use in December.

In 1858 he began the *Astronomical Notices*, published at Ann Arbor, as a medium for the regular publication of observations and scientific investigations carried on at the Observatory, and also to furnish practical astronomers ephemerides of newly discovered comets and asteroids. In this as well as in the observational work he was ably assisted by his favorite pupil, Watson, who was assistant observer during the two years after his graduation in 1857. In 1859 Watson and DeVolson Wood, then Assistant Professor of Civil Engineering, received the first master's degrees that the University granted on examination.

Brünnow's *Tables of Victoria*, a very complete work on the motion of this asteroid, involving a large amount of computation, was published in 1858. For this work the Regents placed \$200 at the disposal of President Tappan. Appropriations were also made toward the expenses of the *Astronomical Notices*. The first article of Volume 1 of that publication was Brünnow's "The General Perturbations and Elliptical Elements of Vesta," another valuable contribution on the motion of the asteroids. This was followed by a paper on the "Oppositions of Vesta." Watson contributed observations on comets and asteroids. Articles and observations were contributed from various observatories in this country, including Hamilton College, Dudley, Harvard, Naval, and L. M. Rutherford's, also

from several in Europe, including Bilk, Upsala, Hamburg, and Madrid. "On a Magnetic Break-circuit" describes a contribution by Brünnow to practical astronomy. In his words, "I hit upon the idea of using the attractive force of a small magnet connected with the pendulum." The small break-circuit mechanism "was executed with great nicety" by R. F. Bond of Boston; it could be applied to the pendulum of any clock without making alterations of the clock necessary or disturbing its uniform rate. A mention of the new mechanism was followed by an article by Bond on his isodynamic escapement.

The disturbing criticisms continued—that the Observatory was too extravagant a project for a state university, that the department reached only a few students, and that they could not understand Brünnow's English. He felt, however, that the success of the Observatory was assured, especially as it was to collaborate with two of the best American observatories in a great task, a large catalogue of stars, but he resigned in 1859 and went to Dudley Observatory, Albany, as Associate Director. His resignation was accepted apparently in good faith by the Regents, resolutions of commendation were passed, and the impression was given that he had left for the sake of a higher salary (see also Part I: TAPPAN ADMINISTRATION). He retained the directorship of the Observatory at Ann Arbor without salary, and offered to advise Watson, who was left in charge. At the same time, the Regents changed Watson's title to Professor of Astronomy and Instructor in Mathematics, against the advice of President Tappan, who considered the professorship premature.

New troubles arose, chiefly as to the relative merits of published astronomical observations by Watson and Brünnow and as to Watson's conduct of the Observatory. Watson's contributions were

characterized as routine observations which any assistant might make, whereas those of Brünnow, though fewer in number, were said to be more important and to have involved a larger amount of labor in computation. Watson replied that whereas Brünnow had eight published contributions between July, 1854, and September, 1858, he had twenty-one (one report gives twenty-eight), and that although some of them were of minor importance others were more valuable: he had reported the discovery of a comet and the independent though not earliest discovery of a new asteroid, Aglaia, and his paper, "The Orbit of Donati's Comet," in 1858, was accepted as authoritative.

Watson replied to the charges that no observations had been made in 1859-60, that he had failed to respond to telegraphic signals in longitude determination, and that students and others were not permitted to visit the Observatory. He pointed out that Brünnow had taught only a few courses and had had an assistant observer for routine work, whereas he, Watson, had none in 1859-60 and was carrying a heavy teaching load in mathematics and astronomy. He claimed that he had had to entertain visitors and that in spite of these handicaps observations had been carried on and computations had been made.

The Regents were kindly disposed toward Watson; at his request they appropriated funds for improving the building, and their resolution to restrict visitors to the Observatory to one night a month, although it was tabled, is also indicative of their sympathetic attitude.

Friends of the Observatory, however, especially the Detroit contributors, urged the Board of Regents to endeavor to induce Brünnow to return. The result was his reappointment at a higher salary (\$1,500) to begin October 1, 1860. Watson was appointed Professor of Physics

and Instructor in Mathematics at a salary of \$1,000, which he declined at first but finally accepted. Brünnow's return to Ann Arbor was mentioned in the *Astronomical Notices*, fourteen numbers of which had been published at Albany. Publication at Ann Arbor was resumed in October, 1860, and was continued through the issuance of the twenty-ninth and last number on March 18, 1862.

In the summer of 1860 Brünnow visited Peters at Hamilton College Observatory and with him observed a partial solar eclipse, recording the time of beginning and end.

In addition to the work on star positions in co-operation with Mitchell, Brünnow undertook to observe all double stars south of the equator visible at Ann Arbor, and to furnish regular observations on eight assigned asteroids, also observational data on all newly discovered asteroids and comets.

Arrangements were made to carry out meridian-circle observations in connection with Hamilton College for the determination of the longitude of the Detroit Observatory. The value derived by Brünnow in 1861 was $5^{\text{h}}34^{\text{m}}54^{\text{s}}.87$ W. The adopted value for Harvard, with which Hamilton had been connected, was revised later, and the longitude of the Walker meridian circle at Ann Arbor is now fixed at $5^{\text{h}}34^{\text{m}}55^{\text{s}}.27$ W. Brünnow's value for the latitude was $+42^{\circ}16'48''.0$, in close agreement with the present adopted value $+42^{\circ}16'48''.7$.

An article on flexure by Brünnow appeared in 1861. Star observations, however, constituted his chief work during the remainder of his period of service in Ann Arbor. At the end of President Tappan's administration in 1863, Brünnow left for Germany, taking his star observations with him.

In the meantime Watson, as Professor of Physics and Instructor in Mathematics, had continued to contribute publi-

cations in astronomy, but not of an observational nature. In 1860 his *Popular Treatise on Comets* appeared. He disproved that "dry fogs" were caused by comets and branded Whiston's attempt to account for the Biblical flood by their influence "the effect of a mind devoted to speculations." He included discussion of a resisting medium, the nebular hypothesis, and the stability of the solar system, and concluded with general remarks on infinity and Omnipotence.

He became interested through Gould in the reduction of the Washington Zones, and devoted much time to this work.

His article, "On the Correction of the Elements of the Orbit of a Comet," published in the *American Journal of Science and Arts* in 1863, later became the subject of attack.

While teaching at Michigan Brünnow had felt the need of an English text on spherical astronomy and had made arrangements to translate his own *Lehrbuch der sphärischen Astronomie*, but only after his return to Germany was he able to complete his translation, which was published in 1864. In the following year he became Astronomer Royal of Scotland and Andrews Professor of Astronomy at the University of Dublin. His son, Rudolph Ernst Brünnow, later became professor of oriental languages at Heidelberg University.

The administration of Watson as Professor of Astronomy and Director of the Observatory began auspiciously in the fall of 1863. The resolution appointing him in August of that year lists, in his support, the leading astronomers in the United States, including Professor Elias Loomis of Yale College, Professor Benjamin Peirce of Harvard College, Dr. B. A. Gould of the United States Coast Survey, Professor William Chauvenet of Washington University, St. Louis, Joseph Winlock, the superintendent of the

Nautical Almanac office, and Commander J. M. Gillis, of the United States Naval Observatory, Washington (*R.P.*, 1837-64, p. 1062).

The Tappan party, however, was yet to be heard from. Watson was accused of plagiarism; the charge was made that his article "On the Corrections of the Elements of the Orbit of a Comet" in Silliman's *Journal* was taken from Brünnow's notes. Cleveland Abbe contributed a paper somewhat similar but less detailed, entitled, "On the Improvement of the Elements of a Comet's Orbit: Brünnow's Method," and credited it to notes made in 1858 from Brünnow's lectures. Watson's contributions, however, continued to appear in the *Journal*.

There was another bone of contention in that the site of the Observatory was inaccessible and that its foundation was unsteady. Citizens of Ann Arbor advocated the removal of the Observatory to the campus. It was said that Brünnow before his resignation had favored this change of site, and Watson was represented as favorable, because he thought a better foundation might be had and that the proposed location would be more convenient and the instruments more useful. In 1865 the citizens of Ann Arbor subscribed \$10,000 for the project and the city proposed to pay the Regents \$10,000 for the building and the site. Tappan wrote from Berlin October 27, 1865, to Professor Edward P. Evans, of the Department of Modern Languages:

... Your account of Watson's maneuvering is very amusing. And they really thought to blast my reputation by moving the Observatory! Every body knows . . . that I am responsible for everything respecting the Observatory excepting its location upon a hill. That was decided while I was absent in Europe, & I had absolutely nothing to do with it. (Perry, p. 352.)

President Haven presented reasons for retaining the site, and the Regents were

in favor of keeping the five acres of land. Watson joined these forces and made an appeal in behalf of the Observatory, including among its needs about \$3,000 for changes in the building, an endowment of at least \$10,000 for one or more assistants, and a publication fund, at least \$10,000, for astronomical and meteorological contributions. Haven, in his report for 1866, called attention to the resources and the number of assistants of other observatories whose contributions to science during the preceding few years he intimated were not as great as those of the Detroit Observatory, and concluded:

Let the liberal friends of science in Detroit complete the work which they have so happily begun; let the building be enlarged and let the Observatory have an independent endowment of about \$30,000, the interest of which will support the Director and pay for the printing of valuable observations and calculations and other papers, and the whole will be a perpetual and noble monument of the far-seeing liberality of its founders. (*P.R.*, 1866, p. 3.)

Watson proposed to present the subscription list in person to "as many of the solid men of Detroit as possible." The Detroit editors took up the question. One, not entirely convinced, expressed a representative attitude:

... But, before the building is enlarged our citizens are interested in procuring its removal to a more suitable, central and *get-able* location. It has been for years conceded that a mistake was made in locating the Observatory. (Winchell, MS, "Scrapbook," II: 24.)

The President of the University and the Director of the Observatory won the argument. The citizens of Ann Arbor were also convinced upon the cancellation of their subscriptions. The Observatory building was enlarged, both cities having responded to the new appeal with \$3,000 each, with the understanding that

\$500 from Ann Arbor would be used for roads (see Part I: HAVEN ADMINISTRATION).

The courses in astronomy offered in Watson's time were similar to those given by Brünnow. In 1868-69 Descriptive Astronomy was included in the junior year of the classical, the scientific, the Latin and scientific, and the civil engineering programs of study. The special two-year program in higher astronomy was retained. In 1868-69 the description of two of the courses was somewhat changed; these appeared as "Numerical Calculus; Theory of Interpolation; Method of Least Squares" and "Physical Astronomy; Calculation of Special and General Perturbations of Planets; and Perturbations of Comets." A revision of the special program in higher astronomy was announced for 1875-76. Only the general topics which would "give direction to the lectures" were listed. They were:

Formation of the Fundamental Equations of Motion. Integration of the Equations for Undisturbed Motion, and Determination of the Elements of the Orbit. Theory of Interpolation. Calculation of Ephemerides.

Calculation of the Orbits of the Celestial Bodies from Three or more Observations. Correction of the Elements. Combination of Observations by Method of Least Squares. Special and General Perturbations. Determination of Time, Latitude, and Longitude.

Theory of the Instruments. (*Cal.*, 1875-76, p. 75.)

A course especially for students of engineering, Spherical and Practical Astronomy, was introduced in 1878-79. In the same year physics and mathematics were made prerequisites, and the order in which courses in astronomy might be elected was designated. Watson's general lectures in Astronomy 2 had to be preceded not only by Physics 1 but also by some elementary work in astronomy, "as Lockyer's, Loomis's, or White's."

Watson's discovery of asteroids was one of his outstanding achievements. Soon after his appointment as Director he began the preparation of ecliptic star charts to use in this work. Although the charts were not entirely completed they served their chief purpose by providing fields for search and comparison stars for the measurement of motion in the discovery of twenty-two asteroids. Watson found more than one-fifth of the total number discovered between 1863 and 1877 (Eurynome to Clytemnestra). Juewa was discovered at Peking, China, during the transit-of-Venus expedition. For the discovery of six in 1868, an unprecedented feat, and three previously, he was awarded the Lalande prize by the French Academy in 1870.

Watson's "bagging asteroids" became a well-known local phrase. An Eastern paper, the *Providence Journal*, Providence, Rhode Island, in 1871 contained an article with the following comment:

. . . Discovering asteroids is getting to be an every-day affair. One of the professors in Ann Arbor, Michigan, just received a gold medal from some European society for discovering nine of them . . . They are not of much account and gold medals might be more worthily bestowed. (*Chronicle*, 2 [1871]: 57.)

This was termed "sour grapes" by his admirers.

He left a fund with the National Academy of Science to provide for computing and publishing tables of his asteroids. The distinguished theoretical astronomer Simon Newcomb was on the first board of trustees of the Watson fund. The unruly asteroids provided a merry chase. Several proved so wayward that they eluded pursuit for many years.

In 1869 Watson accepted the supervision of work committed to him by Professor Benjamin Peirce of Harvard, Superintendent of the United States Coast Survey, on the improvement of lunar

tables for use in calculations for the *American Ephemeris and Nautical Almanac*. Existing moon tables at that time needed correction, especially for practical navigation. Meridian observations and star occultations provided more exact data to check improved theory. In his report to the president in 1872 Watson stated that the work on lunar theory had progressed well. Messrs. Kintner, Edgerton, Burton, Ritter, Baker, and Chute, all Michigan alumni, were engaged in computation under Watson's direction at the expense of the United States Coast Survey. During five years' work on the motion of the moon, the theories of Hansen and Peirce were compared with observations. The result was quite satisfactory, but was not published and is lost.

Watson had charge of the transit-of-Venus expedition to Peking, China, in 1874, which was his most important scientific commission. Two years before the event he was appointed astronomer-in-chief of the expedition by the United States Government and was granted a leave of absence for 1873-74. Several parties were sent out under the commission created by Congress. The scientific data obtained by the party to Peking is included in the volume on the *Observations of the Transit of Venus, December 8-9, 1874*. All four contacts were observed, although the times were somewhat uncertain because of thin clouds, unsteadiness of the image, the "black drop," and the atmosphere of Venus. Mrs. James C. Watson called time and acted as recorder for her husband.

In 1875 Watson interrupted his return trip from the expedition to China to cooperate with Egyptian engineers in establishing a fundamental geodetic survey. For this service he accepted no monetary honorarium, but was decorated as Knight Commander of the Imperial Order of the Medjidieh of Turkey and Egypt.

He was one of the judges of instruments of precision at the Philadelphia Centennial Exposition in 1876, and prepared a comprehensive report on the horological instruments, which was published in book form in 1880. He was present when Alexander Graham Bell demonstrated his newly invented telephone. The illustrious company present on this occasion included Sir William Thompson (Lord Kelvin) of England, the Emperor Dom Pedro of Brazil, and Professor Joseph Henry of Princeton. One report states: "Most of the routine transmitting was done by Professor Watson of Ann Arbor, whose voice appeared to transmit most readily."

In 1877 an appropriation of \$1,500 was made for instruments to observe the transit of Mercury May 8, 1878. Watson appealed in person and secured from the Regents a sum not to exceed \$200 for a building to enable him to locate at the Observatory one of the United States Government stations for the approaching transit. Part of the expense was paid by Congress, and Watson's observations were reported to Washington. Instruments loaned by the government were returned, and an additional appropriation was secured to fit up the building and supplement the equipment for the students' observatory, which was being used more and more.

Watson went on an eclipse expedition to Iowa in 1869, on another to Sicily in 1870, and on one to Wyoming in 1878. For the eclipse in 1869 Congress appropriated \$5,000 for Professor J. H. C. Coffin, superintendent of the *American Nautical Almanac*, who established his station at Burlington, Iowa. Watson, stationed at Mount Pleasant, Iowa, made the preliminary computations and directed the program, personally observing the prominences, their form and distribution, and also the form and extent of the corona.

On the way to the Sicily eclipse he was entertained at the Greenwich Observatory by the astronomer royal, Professor Airy, and after the event received the degree of doctor of philosophy at Leipzig and was made a member of the Royal Academy of Sciences of Italy. Upon his return to Michigan his speeches on his travels in Europe were enthusiastically received.

The year 1878 centered Watson's attention on the problem of "Vulcan," a hypothetical planet within Mercury's orbit, postulated by Leverrier to account for the discrepancy between the observed and computed advance in the longitude of the perihelion of Mercury. The "discovery" of Vulcan had been announced by Lescarbault, but later confirmation was lacking. Watson had obtained from Leverrier data with regard to Vulcan, including the computed times of its transit of the sun, and had made observations in search of the planet. For the solar eclipse July 29, 1878, Watson made a long trip to Separation, Wyoming, in the Rocky Mountains, to look for Vulcan. On that occasion he thought he observed one, or perhaps two, intramercurial planets. His observations were reported to Washington and also to the *Astronomische Nachrichten*. At the University this supposed discovery was accepted as "the most brilliant of the many achievements" of Watson. He had not only found Vulcan but also another planet. But the astronomical world was skeptical. Watson evidently was confident of the existence of Vulcan, for his later efforts were largely centered on this problem.

No one has yet given an adequate explanation of Watson's supposed discovery of two intramercurial planets. He was a careful and experienced observer, yet all subsequent searches have failed to corroborate his observations, and the consensus of present-day opinion is that

no such bodies are in existence; at least of the brightness noted by Watson. Extensive photographic observations made during modern eclipses, mainly by Lick Observatory, have never disclosed any small planet within the orbit of Mercury, though objects far fainter than those noted by Watson should invariably have been discovered. The only possible explanation seems to be that the objects he thought were intramercorial planets were in reality stars.

Watson was freely criticized by students and public for not giving them the opportunity to visit the Observatory and to look through the large telescope. A few students expected to specialize in astronomy, but many wished to look through the famous instrument.

At the beginning of his administration Watson evidently desired to meet this demand. In the fall of 1863 it was announced that the Observatory would be open to visitors every Friday night. This practice, however, was short-lived.

The class of 1869 claimed that there was a "want of enthusiasm apparent" when they were studying astronomy, and assigned it in part to the imperfect illustration which the subject received. "Not more than one-half of those engaged in the study ever entered the Observatory," they said.

In 1874 the following complaint was chronicled:

... During the present week the Juniors have been granted the privilege of making this long-wished-for visit to the Observatory. A passing glance at pale Luna and girdled Jupiter was allowed each man as his row slid [sidled?] along the seat, and then his only sight of the big telescope during his four years' course was over. (*Chronicle*, 5 [1874]: 199.)

Watson's absence while serving as a judge at the Philadelphia Centennial Exposition in 1876 was the occasion of

a thrust by the *Ann Arbor Courier* at the "Accommodating (?) Director of our Observatory":

... If our "star-gazer" has too much to do [to admit visitors], which is possible, if he be not only director of the observatory, but director of the planetary system and Centennial as well, might he not at least on Centennial years have some assistance. . . . (*Ann Arbor Courier*, May 26, 1876.)

The students who declared themselves the sufferers at that time were of the class of 1877; they had seen the Observatory "only afar off." An appeal by the students helped the situation within the University, but so great was the complaint on the behalf of the taxpayers that a committee of the state legislature took up the question. This committee, however, justified his refusal to admit miscellaneous visitors.

As juniors the class of 1879 showed more interest in the subject. They were "sworn admirers of Professor Watson and his mode of teaching" and looked on astronomy "as the most pleasant work of the year."

Student elections in his courses were undoubtedly influenced by the wide acceptance of his *Theoretical Astronomy*, upon which his reputation as a writer was chiefly based. This authoritative work was completed in 1867 and published in 1868; in 1869-70 twelve seniors were enrolled in the advanced work, using it as a textbook. Two editions had been published in the United States and one in England since its first appearance, and it was used as a text at Oxford, Leipzig, Upsala, Breslau, and Utrecht. It is a complete compilation and digest of the theory and method of orbital determination. In his preface Watson traced the historical development of the subject from the time of Newton's discovery of the law of gravitation and gave credit to the chief contributors to date, including Brünnow,

but, with very few exceptions, specific credit was not given throughout the text. Watson covered the whole field very thoroughly and drew pertinent material from every available source, but his great power of assimilation made it all his own. His ability to adapt theory to method and arrange complicated problems in convenient form for solution remains unexcelled.

Watson advocated and practiced the lecture method and in this way contributed to the adoption of the elective system in the University.

His teaching methods were "somewhat peculiar," and the student response varied accordingly. William H. H. Beadle ('61, '67, LL.D. '02) has reported:

... He taught individuals better than classes. He was selective in method, and gave chief attention to those who showed aptness and efficiency. The more one loved the subject the closer Watson was to him. Due to his great celerity in the use of mathematics and enthusiasm for astronomy only comparatively few kept up with his lead. (*Mich. Alum.*, 9 [1902]: 10-11.)

He was a computer of such remarkable skill and rapidity that he is reported to have computed the elliptic elements of an orbit at a single sitting, and on one occasion in a trial of skill he defeated a professional calculator of the lecture platform.

President Angell placed a high estimate on Watson's achievements. Regarding his pedagogic methods the President said:

In teaching he had none of the methods of the drill master. But his lecture or his talk was so stimulating that one could not but learn and love to learn by listening. Sometimes while discussing an intricate problem he would suddenly have an entirely new demonstration flash upon his mind as by inspiration and then and there he would write it out upon the blackboard. (Angell, p. 232.)

Other estimates agree with this. One

class expressed a preference to hear him rather than use a text. Perhaps there was another reason: he was not exacting in recitations or examinations. He is said to have passed on final examination an entire class, including one member who had died shortly after enrollment. His lectures before the whole student body attracted special attention. Sophomores enjoyed giving the freshmen extravagant expectations regarding the personal appearance of "Tubby," whose rotund form, ruddy face, and full voice contributed to his popularity. Frequently there was a large attendance at his public lectures, as after his return from Peking—he had to repeat one travelogue to meet popular demand—but when one of his scientific lectures ran to extreme length, the suggestion was made that some would rather have gone twice.

Hinsdale comments that astronomy was one of the two fields in which the University's advanced work previous to 1878 really deserved the name of graduate study. It was the "old astronomy," a study chiefly of the positions and motions of the heavenly bodies, that was taught, although spectrum analysis had been placed on a scientific basis in 1859 and later completely revolutionized the study of astronomy by the introduction of astrophysics. As early as 1870, however, special attention was called to the need of a spectroscope, but many years were to pass before this urgent need was supplied.

Despite the Observatory's international reputation Watson was frequently hampered in his efforts to obtain instruments, assistants, and computers. In 1876 President Angell reported to the Regents:

It is much to be regretted that an Observatory at which so much work is done, giving a wide reputation to the University and making most valuable contributions to science, is not provided with an adequate

fund for the payment of assistants and computers, and for the publication of full reports of the labor accomplished. (*P.R.*, 1876, p. 8.)

Watson's request for assistants and funds for publication in the fall of 1878 met with some success; John Martin Schaeberle ('76e) was made an assistant at \$500 and another man was appointed for mechanical work and janitor service.

Watson was greatly interested in the offer of the directorship of Washburn Observatory, newly established at the University of Wisconsin; there he would have the use of a new 15½-inch Clarke refractor and a prospective solar observatory in his search for Vulcan. A committee of the Board of Regents reported in 1878:

.... Professor Watson has done and is doing a large amount of work in the field of original research and computation, not coming strictly within the scope of his work of instruction, and which he has hitherto performed voluntarily and without consideration. (*R.P.*, 1876-81, p. 317.)

In an effort to retain his services the Regents unanimously passed a resolution to support and develop the Observatory and increased his salary from \$2,200 to \$2,700. A local paper complained that this was \$500 more than any other professor in the University received, and ridiculed the "artful cry" that "the University must not lose Watson," which had been raised when it was rumored, after his trip to Wisconsin, that he had been offered \$3,200 and \$2,000 for an assistant.

Nevertheless, Watson left. He apparently made a tentative arrangement in October, 1878, and resigned February 7, 1879. On March 25 his successor, Mark Walrod Harrington ('68, A.M. '71, LL.D. '94), was appointed, his service to begin October 1. Watson died in November, 1880, less than two years after his departure; his illness was brought on by

exposure while he was superintending construction of the astronomer's residence in Madison. The funeral and memorial services for him were held in Ann Arbor.

Harrington had been connected with the University in one capacity or another from 1868, the date of his graduation, until 1876. He was Assistant Curator of the Museum and also taught a number of subjects, including mathematics, geology, zoology, and botany. In 1870-71 his instructorships included French, but he was released from this duty.

In the summer of 1871 he went to Alaska as astronomical assistant on an expedition of the United States Coast and Geodetic Survey, and on his return in December, 1872, presented the University with about two hundred and fifty botanical specimens, nearly one hundred geological specimens, and a few ethnological specimens. He taught in the Department of Geology until 1874 and in the Department of Zoology and Botany until 1876-77, when he was absent on leave to attend the University of Leipzig. The next year he resigned and went to China as Professor of Astronomy in the Cadet School of the Foreign Office at Peking, but returned to America in 1878 because of ill health. In 1878-79 he taught at the University of Louisiana.

The measurement of requirements for the bachelor's degree by actual count of class and laboratory hours (the "credit system") went into effect in 1878-79, the year before Harrington came. Early in his administration the time devoted to Astronomy 2, General Astronomy, was extended from one to three meetings a week, and a new course in meteorology, Astronomy 5, was added.

Under Harrington more astronomical instruments for the use of students were obtained, as well as meteorological equipment, and the practice of issuing regular

meteorological reports was begun. Tri-daily records of the barograph, thermograph, and anemograph were reported to the State Board of Health at Lansing.

Schaeberle, Assistant in the Observatory, continued the observations (chiefly with the Walker meridian circle) which he had begun under Watson. Positions of 155 stars he had earlier observed were published at the Washburn Observatory at the beginning of Watson's administration there. Appended to Harrington's report was a letter from Schaeberle, who summarized the results he had obtained at the University between October 1, 1879, and January 1, 1881, as follows (Harrington, p. 20):

OBSERVATIONS WITH THE WALKER MERIDIAN
CIRCLE

Stars for clock and instrumental corrections.....	561
249 stars for latitude work.....	548
Struve's double stars.....	397
Planets.....	23
Total.....	1,529

With the equatorial telescope, observations were made on twenty-eight nights, chiefly on comets and comparison stars, some of which, not in catalogues, had to be observed with the meridian circle. Two comets were discovered at Ann Arbor during this fifteen-month period. One had been previously seen, but one which Schaeberle found in April, 1880, was new. He added another in 1881. The astronomical results which he and Harrington obtained appeared in various scientific publications.

Harrington had a short leave of absence in the fall of 1881 in order to do astronomical work on the Pacific coast. Further changes were made in the announcement of courses, and Schaeberle was given teaching duties as well as observational work.

In 1882 the Observatory participated in the work on the great comet of that

year. This comet attracted wide attention, not only because of the remarkable luminosity which made it visible by day, but also because opinion as to its identity was divided. Some held that it was identical with the great comet of 1843 and Comet 1880 I and that the periods had been shortened by passage through the solar corona at a distance of only 300,000 miles from the surface, and predicted still further decrease and final fall into the sun. After perihelion the nucleus divided into four parts and even fainter components were seen. The view was then accepted that these three comets were different but followed nearly the same track when close to the sun. Other comets have since been added to this famous group.

The greater part of Harrington's published contributions was in the new field of meteorology rather than in astronomy. His work in establishing the *American Meteorological Journal* in 1884 and in serving as its editor until 1892 stimulated great interest and inspired investigations by others.

In 1883 "The Tools of an Astronomer," an article by him, appeared in the *Sidereal Messenger*. His thesis is well stated: "Our proposition is: that in the progress of astronomy the instrumental art has led the science and has also led advances in the sciences nearest allied." But, although he emphasized the progress which the application of the astronomical telescope, as well as of older instruments, had brought about, he only briefly described the application of the spectroscope and said nothing of its great possibilities.

Another of the publications by Harrington is an undated treatise of twenty-five pages, *The Law of Averages*, in which he describes the curve of frequency and gives an application of some of its properties. He omits the theory of the subject, and refers the reader to Merriman's

Method of Least Squares for additional rules to apply. *Mathematical Theories of Planetary Motions*, the translation of a German work by Dr. Otto Dziobek of Berlin-Charlottenburg, was begun in Ann Arbor by Harrington in collaboration with William Joseph Hussey, but was not published until 1892, when both had left the department.

In March, 1885, Harrington obtained a leave of absence for 1885-86 because of illness; in April classes were placed under Schaeberle, and he was made Acting Assistant Professor of Astronomy at a salary of \$1,600.

Schaeberle continued his observational work until 1888, when he resigned and went to Lick Observatory, Mount Hamilton, California. William Wallace Campbell ('86, Sc.D. '05, LL.D. Wisconsin '02), later president of the University of California, was then appointed Instructor in Astronomy, and held the position until he also went to Lick Observatory in 1891. Campbell, who had received his practical training as an astronomer under Schaeberle, carried on the observational work, chiefly on comets and their orbital determination, and in 1888 published his *Elements of Practical Astronomy*.

In June, 1891, Harrington was granted another leave of absence for the first semester of the coming year and William Joseph Hussey ('89, Sc.D. Brown '12), who for two years had been Instructor in Mathematics, was made Instructor in Astronomy at the same salary he had previously received, \$900, and was placed in charge of the Observatory and of the Department of Astronomy. Harrington then went to Washington to reorganize the meteorological work of the government, and on July 1, 1891, became first Chief of the Weather Bureau.

The government work on the weather had formerly been under the Signal Service, where army discipline had been maintained. He was not a disciplinarian,

and in the role of first civilian chief, with methods acquired in educational work, did not succeed as an executive. After four years he was removed from his position. Then he served for two years as president of the University of Washington. In September, 1898, he re-entered the Weather Bureau as director at San Juan, Puerto Rico. He was recalled six months later and stationed at New York, but retired in June, 1899, because of failing mental and physical health. Soon after retirement he wandered from home and no word came from him excepting a weird message or two and an occasional news item regarding a strange learned character working at menial labor in out-of-the-way places. He even wandered as far as China, the scene of earlier professorial service. In June, 1907, an applicant for shelter appeared at a police station in Newark, New Jersey, unable to identify himself or give an account of his wanderings. In the sanitarium where he was placed he acquired a reputation for great learning, which spread outside and was the means of his discovery by his wife and son in 1908. His condition showed some improvement, but he did not recover sufficiently to remain at home. He died October 9, 1926.

In the autumn of 1891, after Harrington's departure from Ann Arbor, Hussey's title was changed to Instructor in Astronomy and Acting Director of the Observatory. During the year some of the announced courses were not given; meteorology was dropped and has never been offered since that time in the Department of Astronomy. Hussey resigned in 1892 in order to go to Leland Stanford Junior University, and Asaph Hall, Jr. (Harvard '82, Ph.D. Yale '89), was appointed Professor of Astronomy and Director of the Observatory.

Hall, unlike the second and third directors of the Observatory, was not Michigan-trained. He was the son of the

famous Asaph Hall, astronomer, who had studied for a short time at Ann Arbor under Brünnow (see p. 445). Hall, Jr., came to the University from the United States Naval Observatory, where he had been assistant astronomer since 1882, with the exception of four years spent at Yale University.

The announced courses of instruction were continued with very slight change; they included General Astronomy, Spherical and Practical Astronomy, Theoretical Astronomy, and an extended practical course, Astronomy 9, to which only students who received special permission were admitted.

The new Director, whose father had urged him to do meridian-circle work when he came to Michigan, took an immediate interest in the condition of the instruments. Watson had not made regular use of the meridian circle. It was now put into good condition and re-examined for division errors to test Brünnow's results. Brünnow's elaborate series of observations of the Bradley stars made with this instrument had been taken to Europe. Hall resumed work on the Bradley stars, including some for latitude determination and latitude variation.

The need for regular publication of astronomical investigations conducted at the University was one which Hall recognized soon after he came to Ann Arbor. In the way of records very little could be found. Brünnow's *Astronomical Notices*, begun in 1858, had been discontinued in March, 1862. Articles on the subsequent observation of comets and asteroids made here with the twelve-inch telescope by Brünnow, Watson, Schaeberle, Campbell, and Hussey were hard to find, since they were scattered through various astronomical and other scientific publications. Although Hall wished to establish a series of publications and succeeded in producing part of a volume, articles from the Observatory during his

administration continued to appear in outside periodicals, chiefly the *Astronomical Journal*. Most of these writings were by Sidney Dean Townley (Wisconsin '90, Sc.D. Michigan '97).

A paper which Hall presented at the eighth annual meeting of the Michigan Academy in March, 1902, was published in 1904 by that organization, together with a reprint of pages 37-88 labeled "Transactions of the Detroit Observatory, University of Michigan, Part I. Determination of the Aberration Constant from Zenith Distances of Polaris Measured with the Walker Meridian Circle." It contained a historical introduction regarding the Observatory and a brief section on the latitude and longitude, giving the values previously adopted. Then followed a general description of the Walker meridian circle and specific details regarding its various parts, including a redetermination of the errors of the divisions of the circles. An extensive series of observations on Polaris from April, 1898, to February, 1901, was recorded, and the data were combined by the method of least squares. This involved a large amount of computing, for which a grant was received from the Bache fund of the National Academy of Sciences. The value of the aberration constant obtained was $20''.683$; this was rather large compared with the value $20''.47$, which was adopted by the Paris conference of 1896 and is still in use (1942).

The determination of the latitude of the Walker meridian circle was inherent in Hall's method of finding the aberration constant. He obtained $+42^{\circ}16'48''.78$; from Hall's meridian-circle observations Harriet Bigelow (Smith '93, Ph.D. Michigan '04) has obtained a value of $+42^{\circ}16'48''.76$; the present adopted value is $+42^{\circ}16'48''.70$.

Hall's work on the aberration constant was the last he published at the Detroit

Observatory. In 1905 he resigned to return to the United States Naval Observatory, where for the third time he held the position of assistant astronomer. He remained in the naval service until five years after the normal date of retirement; when he left the Naval Observatory in 1929 he held a professorship of astronomy with the rank of commander in the United States Navy. Full of enthusiasm and apparently in good health, he then began work as guest and volunteer observer at the Flower Observatory of the University of Pennsylvania, but in a few months was taken ill and died at League Island Naval Hospital in January, 1930.

William Joseph Hussey was called back to Ann Arbor in 1905 as Professor of Astronomy and Director of the Observatory. In the first three years of his thirteen-year absence he had risen to a full professorship in Leland Stanford Junior University. He had later served as astronomer at Lick Observatory for nine and one-half years, and there had engaged in productive research on comets, asteroids, and other objects, especially double stars. By 1905 he had discovered 1,338 pairs. For the work on binaries in which Hussey and Robert G. Aitken had collaborated at Lick Observatory the Académie des Sciences in 1906 conferred the Lalande prize upon them both. In 1903, under the Carnegie Institution, Hussey had investigated sites in southern California, Arizona, and Australia suitable for the sixty-inch reflector, which was installed at Mount Wilson in accordance with his recommendation. Mount Wilson later became the site also of the famous 100-inch reflector.

In 1905 Hussey went to Egypt in charge of the Lick Observatory expedition to observe the total solar eclipse on August 30, and returned to Ann Arbor in October to begin his new duties.

Here he inaugurated a new era of progress. The reconstruction of Observatory

instruments and the making of new parts were added to the work done at Ann Arbor when the Observatory Shop was established in 1906, and E. J. Madden, a skilled machinist from Pasadena, California, was brought here as instrument-maker. E. P. Pegg and Henry J. Colliau were also appointed to the shop staff, and these three gave valuable service in renovating the old twelve-inch refractor.

In June, 1906, an addition to the Observatory building was authorized, and the Regents made their first appropriation toward enabling the department to do the spectrographic research that has brought new astronomical fame to the University. In January of the next year Hussey asked for more mechanics, the purchase of additional grounds, and the establishment of a United States Weather Bureau station. Through President Angell's endeavors the Weather Bureau station, which is still active, was established. The Regents authorized the appointment of three mechanics and interested themselves in the request for lands. Work on the designs for the large new telescope proceeded at the Observatory under Hussey's direction.

Until the fall of 1907 the new Director was alone in his teaching duties in the department. In 1906-7 he offered seven courses of instruction: the Method of Least Squares and General Astronomy, the Solar System, were the two courses offered in the first semester only; General Astronomy, the Stellar System, was taught only in the second semester; and there were four courses given each semester—Spherical and Practical Astronomy, Theoretical Astronomy, Advanced Practical Astronomy, and Advanced Theoretical Astronomy.

Hussey's plans for the department included not only the continuation of instruction in theoretical and practical astronomy begun by Brünnow, for which the University had long been noted, but

the addition of courses in modern astronomy, including astrophysics. A correspondence begun in March, 1907, resulted in the appointment of Ralph Hamilton Curtiss (California '01, Ph.D. *ibid.* '05) as Assistant Professor of Astrophysics, to begin in October, 1907. While holding a fellowship at Lick Observatory, Curtiss had been associated with Hussey and Aitken. Since 1905, in the position of astronomer at Allegheny Observatory, he had assisted in designing the spectrograph at that institution. In 1907-8 additional courses were introduced, including History of Astronomy, Variable Stars, and Astrophysics; these were all assigned to Curtiss, who also gave the Theory of Errors and Elementary Practical Astronomy. The following year Spectroscopic Binaries was added.

In 1908 the Students' Observatory was moved to allow space for the addition in which the new telescope was to be placed. In the same year Robert P. Lamont made his initial gift of \$1,000 toward the University's large refracting telescope for a double-star survey in the Southern Hemisphere. The Lamont-Hussey Observatory at Bloemfontein, South Africa, "the fruition of one man's generosity and another's vision," is described in a separate article (see Part III: LAMONT-HUSSEY OBSERVATORY).

The single-prism spectrograph to be used with the new reflector arrived in January, 1909. In August, when the Observatory addition was complete except for the dome and the new seismological equipment had been installed, the Observatory began to keep a continuous seismological record. In 1910 the new forty-foot dome was put in place, in January, 1911, the large mirror was ready, and on January 31 the first spectrogram with the new instrument was obtained.

In June, 1911, Hussey sailed for Argentina. This came about as the result of an offer of the directorship of La Plata

Observatory cabled to him in March, 1910, by President Gonzalez of the National University of La Plata. By the arrangement made meanwhile, Hussey was to accept the South American directorship and still retain his position at the University of Michigan, dividing his time between the two institutions, and Ralph Hamilton Curtiss became Assistant Director of the Observatory at Ann Arbor and was to have full charge during the Director's absence. This arrangement continued for about five years.

The staff for instruction and research was permanently enlarged during Hussey's directorship, and several changes took place. Will Carl Rufus (Albion '02, Ph.D. Michigan '15) came into the department as Instructor, and Richard Alfred Rossiter (Wesleyan '14, Ph.D. Michigan '23), who in 1919 was engaged as a telescope assistant, became Assistant Astronomer the next year, and in 1922 joined the teaching staff, is now Associate Professor and in charge of the Lamont-Hussey Observatory in Africa.

Courses of instruction were added from time to time as the department developed and needs were met. A course in navigation was introduced in 1917-18, chiefly for the benefit of men in the United States Naval Reserve units. Preparation for the ensign's examination for deck officers was provided. One hundred and twenty students enrolled in this course under Curtiss in the second semester of 1917-18, and more than half of them later enlisted in the Naval Reserve or Naval Auxiliary Reserve Force. After the World War, elections in the navigation course decreased, but the course has been continued. The number of students electing courses in astronomy greatly increased during this administration, and reached a total of 650 in 1922-23. In 1924-25 it was stated in an article in the *Michigan Alumnus* that the department had fifteen times as many students as it

had had when Hussey's administration began.

The low-dispersion¹ spectrographic program instituted by Curtiss was devoted chiefly to the spectra of early-type stars with broad lines (Class B with emission lines) and has been followed consistently to the present time, although stars of other types have been included. The purpose of the program was early stated: "An effort to establish some classification which shall connect the spectra (of Class Be stars) more closely with a rational theory of stellar evolution."

The *Publications of the Observatory of the University of Michigan*, a series begun in 1912, served as a means of recording and publishing the researches of staff and graduate students. Volume 1, Part 1, contained a general account of the Observatory and its equipment, including the new telescope just installed at Ann Arbor, by Hussey, a description of the single-prism spectrograph, by Curtiss, and an article on the registration of earthquakes at the Observatory, August 16, 1909—January 1, 1912, by Walter Mann Mitchell (Pennsylvania '02, Ph.D. Princeton '05), Assistant Professor of Astronomy.

Part 2 of Volume 1 did not appear until 1915. It gave evidence of intensive work on the observational program, which involved not only Class Be stars, but also the early Potsdam velocity stars not known to be binaries, zone stars (35° to 40° north declination) to sixth visual magnitude, long-period variables, stars of Class R (some to photographic magnitude about 10.5), and selected spectroscopic binaries. Observations of the moon, of stars of Class N, Class O, and other classes, and of new stars, comets, and planets were also recorded, and

in the same number were lists of double-star observations made by Hussey at La Plata Observatory, a record of observations of comets and asteroids by Hussey and others both in Ann Arbor and at La Plata, and the Observatory's earthquake records for 1912 and 1913.

Higher courses offered by the department and the facilities for research in astrophysics attracted many graduate students. Eleven persons completed their work for the doctor of philosophy degree in astronomy between 1915 and 1926, including Rufus, Rossiter, and Hazel Marie Losh. There were six master of arts degrees and five master of science degrees conferred for work in astronomy during the Hussey administration.

Volume 2 of the *Publications of the Observatory* was issued in 1916. In addition to six articles by Curtiss, mostly in continuation of his valuable work on Class Be stars, it contained papers by P. W. Merrill and B. H. Dawson and the doctoral dissertations of Laurence Hadley, Rufus, and Clifford C. Crump.

Hussey withheld publications of the Observatory until a sufficient number of articles was ready to constitute a volume. Volume 3 was published in 1923. The studies by Curtiss again constituted an important part, and there were contributions by C. C. Kiess, F. Henroteau, L. L. Mellor, and Rufus, who had all been on the staff sometime in the period since Volume 2 had appeared. The photographic reproduction of typical stellar spectra by Rufus has been used in many astronomical publications and textbooks in astronomy throughout America and Europe.

A plan to increase the interest in astronomy in the high schools of Michigan and Ontario, fostered especially by William C. Weber of Detroit with Hussey's co-operation, was undertaken in 1922. A program of illustrated lectures was instituted. The outcome was rather dis-

¹ The first prism gave a dispersion of 37.9 Ångströms per millimeter at the H γ line of hydrogen; a new prism installed May 20, 1914, gives 40.3 in the same unit for the same line.

appointing to Mr. Weber. A more ambitious part of his program was the construction of the largest telescope that could possibly be made: an aperture of twenty-five feet was proposed! The project was discussed with President Burton, but nothing ever came of it.

The necessity of arranging for a new Students' Observatory became apparent in the fall of 1922. The laboratory needs of the department were taken into consideration when the plans for Angell Hall were discussed in 1923, but the new Students' Observatory did not materialize during Hussey's administration. This project is described in the article on the Observatory and equipment, which also contains an account of the efforts made during these years to prevent nuisances, to acquire new lands, and to remove the Observatory to a site outside the city of Ann Arbor.

In 1924-25 Hussey gave an extension course in astronomy at Detroit. About fifty enrolled the first semester. Curtiss and Rufus later carried on these classes, which with a few interruptions have been continued.

The total solar eclipse of January 24, 1925, was the occasion of two expedition parties. Hussey, in co-operation with Judge Henry S. Hulbert, Ralph H. Upson, and Francis C. McMath of Detroit, made plans to observe the eclipse from a balloon. A trip was made to Geneva, New York, where President Murray Bartlett and Professor William P. Durfee of Hobart College had assisted in making arrangements. But although \$4,000 had been expended in preparation, a high wind and too limited an open space for filling and taking off prevented the flight of the balloon, and clouds prevented the men from making observations and taking photographs. Clouds also prevailed at Bad Axe, Michigan, where Rufus had gone with another party.

A life-long dream of Hussey's—the

erection of a large telescope in the Southern Hemisphere for a double-star survey—was on the eve of realization in the autumn of 1926. Late in September he was taken ill with pleurisy, and feared that postponement of his trip to Bloemfontein, Orange Free State, would be necessary. With his usual fortitude, however, he left Ann Arbor on October 7 with Mrs. Hussey, Dr. Rossiter, and Dr. Rossiter's family. On October 28, at dinner with friends in London, he suddenly collapsed and died instantly.

Hussey was the first of the directors of the Observatory to die in office. His predecessors, Brünnow, Watson, Harrington, and Hall, had each left Michigan to complete their careers elsewhere.

When the news of Hussey's death reached Ann Arbor, Ralph Hamilton Curtiss was appointed Acting Director of the Observatory. On March 25, 1927, he was made Director, a position for which his heavy teaching responsibilities in the department and his long experience as Assistant Director had well qualified him. He had been actively in charge of all phases of the work during Hussey's many absences in the Southern Hemisphere. His sabbatical leave in the second semester of 1925-26 had been spent chiefly at Mount Wilson, Lick, and Yerkes observatories.

Many difficulties confronted Curtiss in the fall of 1926. In any event the South African trip would temporarily have claimed the time of two important staff members, and Rufus had been given a leave of absence for the full academic year to join the faculty of the University World Cruise. New members were appointed to the staff: Herbert Frederick Schiefer as Instructor in Astronomy, H. F. Balmer as Instructor for one year only, and Morris K. Jessup, a graduate student, as an assistant in astronomy. These three were assigned teaching duties as well as observational work, and several

graduate students assisted in the observing program. Upon Hussey's death, the responsibility of directing the Lamont expedition to South Africa at a distance was added to the new duties of Curtiss as Director. His part in the successful outcome of the enterprise is recorded elsewhere (see Part III: LAMONT-HUSSEY OBSERVATORY).

In 1926-27 the Angell Hall Observatory was made ready for the students. The observational and laboratory requirements in descriptive courses were thereupon increased, which may have had something to do with a decrease in enrollment. In the fall of 1927 visitors' nights at the Angell Hall Observatory were begun; they have proved to be very popular. A complete record has not been kept, but 1,194 visitors in all were received at the main Observatory and at Angell Hall Observatory together in 1928-29. At the Lamont-Hussey Observatory in South Africa 2,606 visitors were recorded during its first year.

Early in 1927 spectrograms of some of the brighter stars on the observing program were obtained with the new two-prism spectrograph, used on the 37½-inch telescope, and tables for the reduction of plates were prepared. Because of the comparatively small light-gathering power of the reflecting telescope and the difficulty of changing from the one-prism to the two-prism spectrograph, the latter has not been put into frequent use.

In September, 1927, the staff was increased by the appointment of Dean Benjamin McLaughlin ('23, Ph.D. '27) Assistant Professor of Astronomy, Allan Douglas Maxwell (California '23, Ph.D. *ibid.* '27), Instructor in Astronomy, and Hazel Marie Losh (Ohio Wesleyan '20, Ph.D. Michigan '24), Research Assistant in Astrophysics. These appointees, together with Rufus, have remained on the staff. Schiefer resigned in September, 1928. In June, 1929, the Regents con-

ferred the title Honorary Curator of Astronomical Observation, University of Michigan Observatory, on each of the three founders of the McMath-Hulbert Observatory—Judge Henry S. Hulbert, Francis C. McMath, and Robert R. McMath, all of Detroit. This Observatory, given to the University in January, 1932, is situated at Lake Angelus, near Pontiac, Michigan (see Part III: McMATH-HULBERT OBSERVATORY). In 1929 the department was so fortunate as to obtain the services of Edward Arthur Milne, Rouse Ball Professor of Mathematics in Oxford University, who gave lectures on astronomy during the summer session.

The student laboratory work continued to be enriched by the installation of new facilities in the Angell Hall Observatory; otherwise there was little change in courses of instruction during the Curtiss administration. Student enrollment in 1928-29 reached a total of 534.

Graduate instruction continued to receive special attention; in the years 1927 to 1929, inclusive, six doctor's degrees and six master's degrees were conferred in the field of astronomy. Among the studies for the doctor's degree were two in spectrophotometry made possible by the loan of a Moll self-registering spectrophotometer by the Department of Physics; these were "A Spectrophotometric and Spectroscopic Study of Phi Persei," by Schiefer, and "A Microphotometric Study of the Spectrum of Beta Lyrae," by Mrs. Laura E. H. McLaughlin.

The project for the purchase of a more favorable Observatory site and larger and more up-to-date instruments again came to the foreground in 1928-29 and received the definite approval of the Board of Regents. Also, some steps were taken toward its realization.

Publications of the six doctoral theses was delayed awaiting the next volume of

the *Publications of the Observatory*. This work was postponed by Curtiss on account of other duties, including the preparation of an article, "The Classification and Description of Stellar Spectra," for the *Handbuch der Astrophysik*. The publication of articles by members of the staff was also withheld in accordance with the plan to publish by complete volumes rather than by separate numbers.

In the midst of these Observatory and departmental problems and of many personal research projects in different stages of progress Curtiss was stricken with serious illness and passed away on Christmas day, 1929. Rufus was appointed Acting Director of the Observatory and Acting Chairman of the Department of Astronomy, and was placed in charge of the South African expedition.

All of the announced courses of instruction were continued during the year 1929-30. The total enrollment reached 535 that year; three master's degrees were granted in astronomy, and Walter J. Williams, Instructor in Astronomy for the period 1928-30, received the degree of doctor of philosophy. Williams' thesis, begun under Curtiss, was "A Spectrographic Study of P Cygni."

In September, 1930, Heber Doust Curtis ('92, Ph.D. Virginia '02, Sc.D. hon. Pittsburgh '20), Director of the Allegheny Observatory, was appointed Professor of Astronomy and Director of the Observatory. He arrived in October. Curtis, whose work had been principally in spectroscopy and nebular photography, had had charge of the D. O. Mills expedition of the Lick Observatory at Santiago, Chile, from 1906 to 1910.

Curtis,¹ Rufus, McLaughlin, Maxwell, and Miss Losh, who with Robert M. Petrie made up the staff in 1930-31, have all remained to 1942. Petrie, after having served as Instructor since 1930, resigned in 1935 to go to the Dominion Astro-

physical Observatory at Vancouver. His place was filled by Robley Cook Williams (Cornell '31, Ph.D. *ibid.* '35), who in addition to his teaching duties has given expert service to the University in the supervision of the aluminizing of the large mirror for the 37½-inch reflector. Curtis has improved the slow-motion guiding of this reflector. The Observatory project has progressed further under his administration, although the years of financial depression temporarily brought plans to a halt. New equipment has been installed in the Angell Hall Observatory, and the disk for the new 97½-inch mirror, which when completed will rank third in size in the world, has been cast and stored.

The number of students enrolled in courses in astronomy increased from 653 in 1930-31 to a maximum of about nine hundred in 1933-34, and then decreased to 710 in 1936-37. In the years 1931 to 1937, inclusive, eight master's degrees were conferred and seven candidates completed the doctorate, including one who received the degree of doctor of science.

McLaughlin has been in charge of the spectrographic program. He has also supervised the research work of candidates for the doctorate in astrophysics.

Curtis conducted a party to Fryeburg, Maine, to observe the total solar eclipse of August 31, 1932. Clouds interfered at times during partial eclipse, and light clouds were present at the time of totality, which lasted about ninety seconds. Excellent large-scale photographs of the corona with a forty-foot camera were obtained, however, and also motion pictures by the McMath-Hulbert staff with seventy-four-inch-, forty-inch-, and fourteen-inch-focus cameras. Flash spectra were made by Curtis with a grating spectrograph for the infrared and by McLaughlin with a two-prism instrument. The large interferometer for special work

¹ Died January 9, 1942.

on the green coronal line, 5303A, was operated by William Frederick Meggers of the Bureau of Standards. This consisted of etalon plates four and eight-tenths inches in diameter with a Ross lens of three and five-tenths inches aperture and seventy-two inches focal length. Comparison rings were provided by neon plus mercury, neon, and helium tubes. Interference was recorded for the bright prominence and is suspected on the coronal ring. Curtis was of the opinion that the light clouds prevented a stronger record. He made plans for another attempt to obtain the exact wave-length of the green coronal line at the total eclipse of June 8, 1937, but illness prevented him from

joining the eclipse expedition of that year.

At the beginning of his administration an accumulation of unpublished papers was on hand, including articles by members of the staff and theses by graduate students in astronomy. The system was changed to permit the publication of monographs. Volume 4 appeared in 1931-32. Volume 5 (1934) consisted of fifteen papers, Volume 6 (1937) contained twelve, and Volume 7 (1939) contained nine papers. The increased amount of published material by members of the staff and graduate students indicates that the change in method of publication was opportune and well advised.

W. CARL RUFUS

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THE ASTRONOMICAL OBSERVATORIES AT ANN ARBOR

THE earliest indication of a specific desire for astronomical equipment at the University of Michigan is to be found in the Regents' report to the superintendent of public instruction in 1849. The Regents expressed regret for the lack of "philosophical apparatus," and particularly of a "Telescope or Sextant or Orrery, or transit instrument," and hopefully remarked, "A law exists authorizing the Board to purchase apparatus." No steps were taken toward the realization of this hope until the beginning of the Tappan administration in 1852.

In his inaugural address President Tap-

pan outlined plans for developing a true university, in the highest sense of the term, and appealed for assistance. Soon after the address Henry N. Walker of Detroit volunteered and inquired what he could do. The President proposed a campaign in Detroit to secure funds for an observatory. The initial meeting to promote the project was held at the Michigan Exchange, Detroit, December 29, 1852. There President Tappan made an appeal, and \$7,000 was subscribed. General Lewis Cass, Henry P. Baldwin, later Governor of Michigan, Senator Zachariah Chandler, and Henry N. Walker were among the twenty-eight promi-

nent citizens who responded on this occasion. The name "Detroit Observatory" was proposed to stimulate the response and was used until 1931.

The President continued to take an active part in soliciting and collecting subscriptions. One day Mr. A. C. McGraw saw him walking the streets of Detroit in pursuit of funds, hailed him, and contributed the price of a pair of shoes. The *Catalogue* for 1852-53 announced that \$10,000 had been subscribed for the Observatory.

The generous response to the appeal for subscriptions made it possible to expand the original plan, which called for a large telescope only.

President Tappan left for Europe in 1853, chiefly to visit observatories and to secure equipment. Walker accompanied him to New York, where a contract was made with Henry Fitz for a refracting telescope with an objective lens at least twelve inches in diameter and a focal length of 200 inches, to be equipped with eyepieces to give magnifying powers up to 1,200. The cost was to be \$6,150 and the date of completion June 1, 1854. This was the first large telescope to be constructed entirely within the United States, and was the third largest refractor in the world. The Harvard College Observatory at Cambridge and the National Observatory at Pulkowa, Russia, each had a giant refractor fifteen inches in diameter. Cleveland Abbe, founder of the United States Signal Service, who studied at the Observatory soon after it was opened, has claimed that "national pride and financial economy" largely determined the selection of Fitz as constructor.

During the President's absence in the spring of 1853 Walker¹ engaged George

Bird of New York to furnish plans for the Observatory building and to superintend construction at a cost of \$300. Traveling expenses were added later. Walker also requested the Regents to appoint someone to direct the location of the Observatory on the University grounds.

President Tappan wished to secure in Europe a meridian circle and a sidereal clock equal in excellence to the telescope. For this purpose he had \$4,000, which Walker had advanced.

He visited Sir George Airy at the Greenwich Observatory and saw the eight-inch circle constructed by Ramsome and May of Ipswich and Simms of London, but considered it too expensive. At Rome Father Secchi of the Observatory of the Roman College gave him a letter to Oertel, instrument-maker of the renowned Optical Institute of Munich.

In Berlin Tappan met Professor Encke, Director of the Royal Observatory, who recommended the instrument-makers Pistor and Martins of Berlin. From that firm on July 15, 1853, the President ordered a meridian circle for 4,000 thalers (about \$3,200), with the understanding that Encke and his young assistant, Franz F. E. Brünnow, particularly Brünnow, would supervise its construction and approve it before shipment. It was to be completed by May 1, 1854, and payment was to be made upon its arrival and acceptance in Ann Arbor.

For one month Brünnow thoroughly tested the sidereal clock purchased for the University from M. Tiede of Berlin, and pronounced it an excellent piece of workmanship.

When he was told of the twelve-inch telescope ordered of Fitz, Brünnow responded: "You will have one of the first observatories in the world." President Tappan proudly replied: "Indeed, I contemplate nothing less, and I cannot but be sanguine of the results we shall arrive at under the transparent and serene skies

¹ This statement has usually been accepted. A clipping in Winchell's scrapbook states that Professor Buhl of New York was selected by President Tappan for this work.

of Michigan, when we shall have provided an Astronomer worthy of the Observatory we are thus furnishing" (*P.R.*, 1853, p. 6).

This conversation, with its oversanguine reference to Michigan skies, illustrates President Tappan's just personal pride in the project, which he frequently referred to as "our noble Observatory." In his well-known "Historic Statement" just at the close of his administration he wrote: "I cannot speak of the Observatory without emotion. No one will deny that it was a creation of my own."

In Ann Arbor, the committee on the Observatory site met with difficulty. Evidently its members, the Honorable Elon Farnsworth, the Honorable Henry N. Walker, and Professor Silas H. Douglass, did not unanimously approve "the center of the University grounds."

A special meeting of the Board of Regents in July, 1853, was called to decide the question, but a quorum was lacking. The members present visited the proposed country hilltop, then outside the limits of Ann Arbor, discussed the proposition, and adjourned without formal action. However, an agreement was evidently reached. At the November meeting purchase of the balance of the site was authorized, including four acres from the land of a Mr. Benham at \$100 per acre. The earliest *Catalogue* to describe the Detroit Observatory contained the statement: "It is situated half a mile from the University grounds on a hill 150 feet above the Huron river, from which is presented one of the most charming views of the country."

Another difficulty was encountered. The enlargement of the original plan incurred unforeseen expenses. After the return of President Tappan two collimators (small telescopes to adjust the meridian circle) were added to the order of Pistor and Martins at a cost of \$375. Other auxiliary instruments were needed.

Another subscription campaign in Detroit in May, 1854, resulted in twenty-three gifts, totaling only \$1,150, but President Tappan, backed by Walker and other friends, pushed the project, and in July, 1854, when the new Director arrived, the building was nearly finished. It was soon ready for the arrival of the instruments. The attractive setting, as it then appeared, has been preserved in the famous oil painting made by J. F. Cropsey in 1855, from which an engraving was prepared for the *Catalogue* of 1855-56. The original painting is now in the University's possession, a gift from the Honorable Andrew D. White.

The superintendent of grounds and buildings was authorized to purchase lumber and enclose the site with a plain substantial fence. A committee applied to the city council to secure the construction of roads to the Observatory. In 1856 the mayor again brought up the question of roads, and the need was soon met in country fashion by a new turnpike.

The Observatory building was soon ready to occupy. (The history of the development and activities of the Observatory staff, except for the construction of new instruments, is omitted from this article. See Part III: DEPARTMENT OF ASTRONOMY.) The central part is thirty-three feet square, and there are two wings, each nineteen by twenty-nine feet. The central part is surmounted by a revolving dome twenty-one feet in diameter and contains the pier for the large refractor. The pier extends fifteen feet below the surface and is constructed of solid masonry, twenty-two feet in diameter at the base and six feet at the top, where it is capped by a large circular limestone quarried at Sandusky, Ohio. This carries a vertical limestone monolith, which supports the iron pier cap. The center of motion of the instrument is about thirty-three feet above ground

level. The east wing was designed for the meridian circle and the other for a library and an office for the director. The Walker meridian circle, so called in honor of Henry N. Walker for his interest in the Observatory project and his gift of \$4,000 for the instrument and accessories, arrived in September, 1854. It bears the name of the makers, Pistor and Martins, Berlin, and the date, 1854. It has an objective 6.3 inches in diameter and a focal length of 96.8 inches. Its graduated circles, 37½ inches in diameter, ruled to ten minutes on one side and two minutes on the other, are read by microscopes to tenths of seconds of arc. One circle was slightly bent in shipment. The collimating telescopes have apertures of two inches and focal lengths of about twenty-four inches. They are mounted on piers, one north and the other south of the meridian circle, on a level with its axis.

The Tiede clock, No. 125, was mounted near the meridian circle and rated to sidereal time. At first star transits were observed by the eye-and-ear method. Soon additional equipment was installed, including a chronograph, originally placed in the west wing, two chronometers, standard barometers, and thermometers to give data for atmospheric-refraction corrections and a four-inch portable comet seeker by Henry Fitz.

The large telescope was not completed on time, so Fitz, the contractor, loaned one in April, 1855. The new one arrived in December, but was rejected, owing, it is said, to the use of cast iron for parts of the instrument and its mounting. A new contract was made at \$6,750, an increase in price of \$600, and the use of brass and bell metal was specified. The project now faced a debt of about \$8,000 and another campaign in Detroit was launched in March, 1856, which raised about \$3,500.

The new telescope arrived in Ann Arbor in November, 1857. In December it

was ready for use. By this time the building and equipment had cost about \$22,000. Citizens of Detroit contributed about \$15,000, and for many years the name "Detroit Observatory" was used in recognition of their generosity. President Tappan frequently referred to it as an observatory of the first rank and said that he knew of no other instance of one of its class erected at so little cost. The main expense was due to the instruments and as little as possible was spent on the building. In spite of the President's zeal in soliciting and collecting subscriptions and his carefulness in expenditures an annoying debt was incurred, part of which was carried on personal account, which remained open and unpaid for several years, adding to the friction between him and members of the Board of Regents. At one time (October, 1856) the treasurer of the University, John M. Chase, made a loan of \$4,900 to President Tappan on the Observatory account, holding the President's personal notes and a chattel mortgage on the equatorial telescope as security. An auditing committee requested by the President made a satisfactory report in 1859. Not until December, 1863, however, after the close of the period of Tappan and Brünnow, were the Regents able to record: "The old Observatory debt has been paid."

Brünnow, while at Dudley Observatory during the year 1859-60, retained the directorship of the Observatory in Ann Arbor, but James Craig Watson, Professor of Astronomy and Instructor in Mathematics, was in charge. Watson secured appropriations from the Regents for constructing a room and furnishing the west wing of the Observatory in 1860.

In the autumn of 1863, under the presidency of Erastus O. Haven, Watson became Director of the Observatory.

Early in the administration of Presi-

dent Haven there was agitation to move the Observatory to the campus (p. 448). In the course of the discussion attention was drawn more and more toward what would be the requirements of operating the Observatory efficiently on its established location. In the end, \$500 was appropriated for roads by Ann Arbor citizens, and an addition was made to the Observatory building. The enlargement, completed in 1868, included a residence for the director on the west side of the original building. It was further repaired and enlarged in 1905-6.

The records show that new instruments were requested from time to time, but were not furnished. In 1870 the Regents were asked to provide the Observatory with a spectroscope. Among the requests not granted this is perhaps the most significant, for the instrument has been of fundamental importance in the later development of astronomy.

A small, separate building was constructed on the occasion of the transit of Mercury, May 8, 1878, when the Observatory was made temporarily a United States Government station. This building, which was located about one hundred feet southeast of the main Observatory, was later remodeled and equipped for the use of students. It contained a six-inch equatorial refractor and a three-inch transit, with zenith telescope attachment.

In 1878 H. A. Wetzel gave a 2½-foot hemispherical cast of the moon, representing its elevations and depressions, which was of "great usefulness in the teaching of astronomy."

A new director, Mark Walrod Harrington, took charge on October 1, 1879. In response to his request soon after arrival, \$850 was appropriated for meteorological instruments. He secured a Hough's barograph, a Hough's thermograph, and an anemograph of St. Gibbon's pattern for wind velocity and

direction. From the United States Signal Service he obtained a standard thermometer, a psychrometer, a terrestrial-radiation thermometer, and a solar-radiation thermometer.

In the spring of 1880 Harrington appealed for more astronomical instruments to be used in instruction. He reported that some loaned by the Navy Department had been recalled and that the large instruments (the twelve-inch refracting telescope and the Walker meridian circle) were not available for student use. A total of \$3,050 was appropriated—\$1,800 for a six-inch equatorial telescope, \$1,000 for a three-inch transit, and \$250 for a chronometer. Reports previous to Harrington's administration indicate that a six-inch telescope and a three-inch transit with zenith telescope attachment were in use in the Students' Observatory. Apparently these were among the instruments "recalled" by the Navy Department, and new ones were obtained.

Near the end of this administration, upon Harrington's request for a good astronomical globe, Bailey's cosmosphere was demonstrated before the Regents by a Mr. Morley, but the question was referred to a committee, and we find no record of purchase of the globe.

Harrington left at the end of June, 1891, and for one year the Observatory was managed by William Joseph Hussey, Instructor in Astronomy and Acting Director of the Observatory. No changes of importance were made in the physical equipment during that year. Hussey then left the University for some years, and Asaph Hall, Jr., became Director.

Upon his arrival at Ann Arbor in 1892 Hall first gave attention to the condition of the instruments, which had been surpassed in size and efficiency by those installed at other institutions and which were in need of being cleaned and readjusted. He reported that the instruments

were in bad condition. It was necessary to take the objectives apart and clean them. The Tiede clock had an irregular rate. As far as he could find out the driving clock of the twelve-inch telescope had never been of any use, and Watson had not made regular use of the Walker meridian circle. Hall had the object glass of the meridian circle taken to Clarke and had a spring put into the cell to act against the glass. He obtained a new micrometer from Repsold, a chronograph from Saegmüller, and a clock from Howard. With these improvements and accessories the instrument was remounted; it was then subjected to a very complete investigation.

The condition of the Observatory and of the Department of Astronomy was subjected to serious criticism in 1903. The Fitz objectives for large telescopes were surpassed in quality and size by Clarke. The twelve-inch telescope, once the pride of Michigan and third largest refractor in the world, was small compared with many newer ones, notably the forty-inch telescope at Yerkes and the thirty-six-inch telescope at Lick. The Meridian circle was antiquated. Instruments for work in astrophysics were lacking, and the Observatory was rapidly being surrounded by buildings. An enthusiastic alumnus, after calling attention to its brilliant past, concluded with the appeal, "Michigan and her alumni should not allow her observatory to fossilize" (Abbe, p. 421).

The only important purchases made about this time were a sextant instrument at \$150 in 1902 and in 1904 a surveyor's transit, for which \$375 was appropriated.

When Hussey returned as Director of the Observatory in October, 1905, he found the Observatory building and equipment in need of repairs and improvements. Instruments for research in modern astronomy were lacking. The Observatory library and residence were re-

constructed and enlarged during the winter of 1905-6. The Regents appropriated \$5,000 for this work, and, in addition, the heating and lighting were provided from the general fund.

In 1906 the Observatory Shop was established, furnished with tools for the repair of old instruments and the construction of new, and provided with a staff headed by a skilled machinist.

The reconstruction of the instruments, including the twelve-inch refractor, was begun. Changes to this historical telescope included a new steel tube to replace the old pine one, a new 3½-inch finder in place of the 2½-inch finder, the addition of a coarse circle in right ascension, the addition of a coarse circle in declination, a new worm and worm wheel, a new driving clock, a new slow motion and clamp in right ascension, a new slow motion and clamp in declination, a new counter-weight arm and weights, and a new right-ascension circle. This work, including the construction of the new parts, was done at the Observatory Shop. A new micrometer for the reconstructed twelve-inch refractor was obtained in 1907 from Warner and Swasey Company. Alterations to the micrometer, including better illumination of the wires and a quick motion in position angle, were made by Colliau of the shop staff.

A new telescope with accessories for spectrographic work was one of the chief requirements. In June, 1906, the Board of Regents made an initial appropriation of \$15,000 toward the construction of a new reflecting telescope and an addition to the Observatory in which it could be housed. Much of the work was done in the Observatory Shop. In August the optical parts for the reflector were ordered from the John Brashear Company, Pittsburgh. A clear aperture of at least thirty-six inches was specified. The glass was cast at Saint-Gobain, France, and after being ground and polished at Pittsburgh

reached Ann Arbor in December, 1907. The diameter of the reflecting surface is $37\frac{1}{2}$ inches. With the eleven-inch hyperbolic secondary the equivalent focal length is sixty feet.

Among the needs which Hussey presented to the Regents in January, 1907, were additional shelves for Observatory books, seismological instruments, and drainage of the Observatory. President Angell and the Regents favored these improvements.

In order to make room for the addition to the main Observatory the old Students' Observatory was moved in 1908 to a location about three hundred feet west of the main building. In the Students' Observatory three rooms were provided, an entrance, an equatorial room, and a transit room. The six-inch telescope was provided with a new driving clock, a new worm and worm wheel, and an electrically driven slow motion in hour angle. A camera was provided for use with the six-inch telescope, having a lens of $4\frac{1}{16}$ inches' diameter and $19\frac{1}{2}$ inches' focal length. In the same year, 1908, a new comet seeker, which was larger and more convenient than the old one, was constructed at the Observatory Shop. It has a lens of $4\frac{1}{2}$ inches and an altazimuth mounting. Parts of the old Fitz comet seeker, including tube and lens, were used in the short focus finder for the $37\frac{1}{2}$ -inch reflecting telescope.

The addition to the Observatory building at Ann Arbor, begun in 1908, was completed the following year. The main floor contained offices for the Director and his secretary, a vault, clock-room, and classroom. On the second floor were additional offices and a photographic room. The basement provided, in addition to utility space, rooms for new seismological equipment, which was installed in August, 1909. These instruments include two Strassburg trometers of the Bosch-Omori type for

north-south and east-west components respectively; also a Wiechert, inverted-pendulum, astatic seismograph, which records both components, and a Wiechert vertical seismograph, which has not proved successful. Continuous records of the two horizontal components have been kept since August, 1909, except during brief periods when the instruments were being cleaned and readjusted.

Work on the $37\frac{1}{2}$ -inch reflector continued in the Observatory Shop, and additional annual appropriations were made by the Regents to cover the expenses of the telescope and accessories, which totaled about \$24,000. The single-prism spectrograph by Brashear, Pittsburgh, used with the new reflector, arrived on January 18, 1909. This instrument followed in general the type of the Mills spectrograph of the Lick Observatory, with some changes which had been introduced in the Mellon spectrograph of the Allegheny Observatory, and further modifications proposed by Ralph H. Curtiss. The forty-foot dome for the new telescope, constructed by the Russell Wheel and Foundry Company of Detroit, was completed and erected in 1910.

In January, 1911, the large mirror was placed in the cell, and all accessories were ready.

In 1922-23 the $37\frac{1}{2}$ -inch reflector was overhauled, and the driving was improved. A new two-prism spectrograph designed by Curtiss was constructed in the Observatory Shop in 1923-24. This instrument was intended for use with a new and larger reflecting telescope, which was part of the plan under consideration for a new site, new buildings, and equipment. The optical parts were by J. B. McDowell. The dispersion is about twice that of the single-prism spectrograph. A Hartman spectrocomparator was purchased the same year.

Attempts to prevent nuisances near the Observatory have been frequent. In

April, 1908, grading was begun on the west end of the Observatory lot for a women's athletic field. Appeal to President Angell stopped the work and that encroachment. In 1910 Robert P. Lamont purchased twenty-six acres of land east of the Observatory for its protection in that direction.

The encroachment of University buildings began to receive serious consideration in 1912. On April 24 Hussey prepared a statement for presentation to the Regents regarding the question of putting the power plant of the University in the "cat-hole" location. The proposed site for the power plant was considered so valuable for that purpose that it seemed advisable to look for a new site for the Observatory and its research instruments. "Huddy Hill," just east of the city, was considered. Sufficient land could have been obtained at an estimated cost of from \$50,000 to \$70,000.

The proposed new Hospital site just north of the Observatory raised the question again in the spring of 1915, and Huddy Hill received further consideration, but no action was taken.

In 1919 the question of the effectiveness of the Observatory on its present site was before the Regents and was referred to the buildings and grounds and Hospital committees, and Hussey recommended to the Regents that the Observatory and equipment be moved to Huddy Hill. This site, however, was not well protected from future encroachments, and action was again delayed when the question was referred to a special committee consisting of the committees on buildings and grounds, the Medical School, and the Observatory. A communication regarding the same question, including the purchase of new equipment, was before the Regents in December of that year; but in 1920 the Board declined further consideration of the question of additional equipment.

The issue regarding site became prominent again in 1922, when the western part of the Observatory grounds was proposed as a site for Couzens Hall, a new dormitory for nurses. Hussey made this record:

Conference with President Burton, Regents Clements and Hubbard, Dean Effinger, Shirley W. Smith, and Professor Shepard concerning Observatory plans, etc., at President Burton's office. At this time President Burton stated that it was not the plan to use any part of the Observatory grounds for other purposes. Two days later the Regents voted to place the proposed Nurses Home on the west end of the Observatory Grounds.

He added, perhaps to modify the effect of the preceding item, "At the same meeting the Regents voted \$18,000 for a new Observatory Shop."

In the *President's Report* for 1922-23 special attention was called to the urgent need of moving the Observatory because of the power plant, the University Hospital, and the projected nurses' home. A high hill about three miles west of the city on Liberty Street was then considered. It seemed advisable that the removal of the Observatory and the increase of equipment, including a new and larger telescope, should be incorporated as a part of the building program advocated by President Burton. The land of the Observatory site, including the twenty-six acres east of the building, if released for other uses, would provide a large amount toward a new site, new buildings, and improved equipment. Again the project was postponed, but the need remained. An article in the *Michigan Alumnus* (31 [1925]: 533) mentioned, in addition to other nuisances, "an earthquake every time a train passes."

Hussey continued the search for a more suitable site. On June 19, 1925, Regent Beal, Secretary Smith, Dr. Ruthven, Mr. Paul Buckley, Professor Leigh Young, and Professor Hussey visited the

hills near Portage Lake adjacent to the University's forest preserve in that vicinity. All seemed well pleased, and action to secure a part of "Peach Mountain" for the new Observatory site was begun. An appropriation of \$1,525 was authorized in September to secure the site, but real-estate complications delayed the purchase. Tentative plans were being developed for the construction of a large reflecting telescope (seventy-five inches), the refiguring of the 37½-inch reflector to adapt it for photographic rather than visual work, and the return of the twenty-seven-inch Lamont refractor from South Africa (see Part III: LAMONT-HUSSEY OBSERVATORY) for double-star work in the North after completion of the southern survey. This program, it was thought, would again bring the institution and its equipment to a prominent position in the astronomical world.

Another project begun but not completed during Professor Hussey's administration was the Angell Hall Observatory and astronomical laboratory for student use. The need of more adequate facilities for this purpose had long been felt, as the number of students electing astronomy had increased rapidly since 1905. The Students' Observatory, previously described, was discontinued in the fall of 1923, when it had to be removed from the site of Couzens Hall. To meet this need the entire fifth floor of Angell Hall was originally designed for the use of the Department of Astronomy, although parts of that floor have temporarily been relinquished for other purposes.

Two twenty-four-foot domes were included in the plans, and later constructed by J. W. Fecker. A ten-inch refracting telescope was ordered from Warner and Swasey to occupy one part, and a reflecting telescope for the other was left to be provided in the future. The two domes by Fecker were erected, and the ten-inch

refractor was installed in the first year of the directorship of Ralph Hamilton Curtiss, 1926-27.

The two-prism spectrograph constructed during Hussey's administration was first used on the large telescope at the main Observatory for about two months early in 1927, but since then has not been put into frequent use.

In 1927-28 a three-inch transit was added to the Angell Hall equipment, and a fifteen-inch pyrex mirror was ordered from J. W. Fecker. Work on the mounting for the reflector was carried on in the Observatory Shop. The mirror arrived on January 24, 1929, and the fifteen-inch reflector was added to the Angell Hall equipment and was ready for student use in 1929-30.

Some progress was made during the administration of Curtiss toward the acquisition of a new site and new instruments for research. The ridge north of Dexter, Michigan, known as Peach Mountain, is cut into two parts by the Huron River. On the west is the site tentatively selected by Hussey; on the east is a slightly lower spur that extends south of Base Lake, on which available space could be obtained.

In November, 1928, Curtiss requested the Regents to secure an option on land in Dexter Township covering this site and extending to the shore of Base Lake. Favorable action was taken, and a part of the land recommended was afterward purchased. The new Observatory project was placed first on the Regents' list of the University's most urgent needs which was presented to the state legislature in 1929. Attention was called to the success of the Observatory under Brünnow, Watson, Hall, and Hussey, and to the impossibility of carrying on scientific work meeting modern improved standards on the old site and with instruments surpassed in size and efficiency at other institutions. The removal of the Observ-

atory, it was also pointed out, would turn over to the Regents thirty acres of land owned chiefly by Lamont, the value of which would be greater than the amount proposed for the new Observatory and telescope. The request was approved, but the financial depression prevented an appropriation for the project.

In the meantime drawings were in progress for a seventy-five-inch reflecting telescope, based upon the plans of the seventy-two-inch reflector of the Dominion Astrophysical Observatory at Victoria. Inquiry was also made as to the possibility of securing a disk of the fused silica quartz used in the experimental work on the 200-inch reflector for the Carnegie Institution; this program was being developed by steps, in the course of which disks sixty inches and 100 inches in diameter had been used.

The purchase of a Howard sidereal clock and of a Hale spectrohelioscope for the Angell Hall Observatory was authorized in 1929-30. A Moll microphotometer from Kipp and Zonen was added to the instruments for research at the Observatory, and a Brown and Sharpe No. 13 universal grinder was obtained for the Observatory Shop.

About two hundred acres south of Base Lake, fifteen miles northwest of Ann Arbor, was secured that year for the new Observatory site. A survey was made and a preliminary layout was proposed for the location of the main buildings. Correspondence was continued regarding means of obtaining the material for a large mirror.

The administration of Heber Doust Curtis as Director began in September, 1930. During the ensuing year the Hale spectrohelioscope, previously ordered, was added to the Angell Hall equipment, and the fifteen-inch reflector for student use was completed, although it was not installed until a year later, when the

Howard clock rated to sidereal time was also ready.

The old name "Detroit Observatory," used in honor of the Detroit contributors from the time when the Observatory was founded, had long given rise to confusion as to its location. Investigation disclosed the fact that this name had never been officially adopted; therefore, in November, 1931, it was dropped by regental action and the name "Observatory (or Observatories) of the University of Michigan" was formally accepted. The collective name now includes the old Observatory in Ann Arbor, the Angell Hall Observatory for students, the Lamont-Hussey Observatory in South Africa, and the McMath-Hulbert Observatory at Lake Angelus, Michigan, a notable gift received from the founders in January, 1932 (see Part III: McMATH-HULBERT OBSERVATORY).

Improvement in the slow-motion guiding of the 37½-inch reflector was made by H. D. Curtis. In the spring of 1934 a motor-driven silvering carriage was constructed and necessary alterations were made to permit the removal of the mirror and its cell from the telescope for silvering the mirror and preparatory to the work of aluminizing. A steel bell-jar of forty-two inches' inside diameter was ordered, to be equipped with necessary pumps and auxiliary apparatus. Williams, who joined the staff of the Department of Astronomy in 1935, was a specialist in the process and supervised the work of aluminizing the mirror in March, 1936. An increase in efficiency in the ultraviolet region of the spectrum was realized as expected.

The present reflector is now far excelled by the larger instruments of many American observatories, and it is probable that no observatory of like rank in America is so unfavorably located for scientific work as is that of the University of Michigan at Ann Arbor.

The future plans for the Observatory definitely involve its removal to the Base Lake site and the installation there of a new and powerful reflector in addition to the 37½-inch reflector now in use. When the work in the Southern Hemisphere is completed the excellent twenty-seven-inch Lamont refractor also may be brought there from South Africa. Only the equipment necessary for instruction will be left in Ann Arbor.

The Base Lake site will eventually comprise over two hundred acres. It is some fourteen miles northwest of the city, well away from any village or community. This makes it especially favorable for scientific work, since astronomy is now at least 95 per cent photographic, and artificial light is the principal enemy of modern astronomical research. When the Observatory was built in 1855 the science was 100 per cent visual, but the growth of Ann Arbor, with its brilliantly lighted streets, has completely cut out many lines of photographic research. Scientific work at Ann Arbor is further hampered not only by the proximity of the railroad and of the large Hospital and other medical units, but also by smoke from the power plant less than one thousand feet to the southwest, for the prevailing winds of this locality come from that quarter.

Curtis accepted the directorship in 1930 with the understanding that the new Observatory project would be stead-

ily pushed to completion. Although the depression necessitated delay, and although some special gift or legislative appropriation must be secured before the building can be constructed and the new telescope completed, at least a beginning has been made.

Curtis drew the plans for the new telescope, and a rough disk for its mirror has been provided through the generosity of the late Tracy W. McGregor, of Detroit. Under this gift a pyrex disk measuring 85½ inches in diameter was cast by the Corning Glass Works, but some fault developed in the long annealing process. A second and larger disk was later most successfully cast. The new disk, now stored near the Observatory, is 98.5 inches in diameter in its unfinished state and 18 inches thick. It weighs about 5½ tons. With the exception of the disk for the 200-inch reflector to be built in California it is the heaviest disk of pyrex yet cast. The finished mirror will exceed 96 inches in diameter, which is surpassed by the 100-inch telescope at Mount Wilson. Even after the completion of the 200-inch disk, the Michigan reflector will rank third in size in the world.

Eventually a plant adequate for astronomical research will be provided, and the work done by the Observatory of the University of Michigan will be commensurate with that which has given it such high rank in the past.

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THE LAMONT-HUSSEY OBSERVATORY

THE lifelong friendship of Robert Patterson Lamont ('91e, A.M. hon. '12) and William Joseph Hussey ('89e, Sc.D. Brown '12) and the latter's special interest in double stars, are well known not only at Michigan but throughout the astronomical world. Hussey taught in the Department of Astronomy in 1891-92, and returned in 1905 for a long term of service as Professor of Astronomy and Director of the Observatory. He has related that in November, 1902, Lamont visited the Lick Observatory at Mount Hamilton, California, and that they had their first conversation concerning the desirability of sending a large telescope to the Southern Hemisphere for the measurement of double stars and for the extension of the double-star survey to the south celestial pole. At that time Hussey and Aitken were conducting a joint program to cover the

sky available at Lick (to -22° declination). By 1905 Hussey had discovered 1,338 pairs, but left his part of the work unfinished in order to return to the University of Michigan. This joint work won for both astronomers the Lalande prize of the French Academy, conferred in 1906.

Administrative duties and the construction of the $37\frac{1}{2}$ -inch reflecting telescope for astrophysical work demanded the major part of Hussey's time and attention until 1911. His dream of a southern station, however, was constantly kept in mind. On April 3, 1908, he and James H. Marks ('08e) went to Chicago to test the polar and declination axes for the large reflector at the Elmer Engineering Works. In the evening Hussey and Lamont attended a world-championship wrestling match. The next day at lunch Hussey spoke of his desire to proceed

with the preparation of plans for a twenty-four-inch refracting telescope for the Southern Hemisphere, and Lamont promised \$1,000 with which to begin. The check arrived on June 14. At this time also began the delays and disappointments that extended over nearly a quarter of a century, during which Hussey's vision never faded and Lamont's loyalty never faltered.

Other problems intervened. One of the first involved the protection of the Observatory site at Ann Arbor, which necessitated the purchase of adjacent property on the east. On October 2, 1908, Hussey wrote to Lamont explaining the situation, and said he needed \$5,000 in cash to meet the emergency. So urgent did he think the need that he took the letter to the midnight train. Before the reply came, a bank loan of \$6,000 was arranged, paid in due time by Lamont. In December he also agreed to buy a large lathe and a shaper for the Observatory Shop and to start the construction of the twenty-four-inch refractor.

Professor Hussey spent a day at the Naval Observatory with Mr. Marks in April, 1909, inspecting the twenty-six-inch refractor and the blueprints of it, and in that one day collected practically all the data that were needed for the design of the twenty-four-inch refractor. On February 20, 1910, during a visit to Ann Arbor, Lamont authorized placing the order for the glass for the refractor, and on March 7, under Hussey's direction, plans and drawings for the mounting were begun by Samuel Pierpont Langley ('08), nephew of the celebrated astronomer of the same name.

A few days later occurred an interruption which Hussey evidently thought might be turned to good account. A cablegram was received March 12, 1910, from President Gonzalez of the National University of La Plata, offering him the directorship of the La Plata Observa-

tory. Acting President Hutchins was consulted regarding the offer, and, according to Hussey's diary, advised him "not to take it," or, at any rate, "to be in no hurry about accepting it." Soon afterward, in Chicago, Lamont suggested that Hussey go and look it over, and offered to pay the expenses of his trip to South America.

Upon Hussey's return from Chicago, the gifts from Mr. Lamont were announced to the Regents—the twenty-six acres of land just east of the Observatory, the large lathe and shaper for the shop, and the glass for the twenty-four-inch objective. Hussey explained to them the La Plata offer, and arrangements were made for a leave of absence to permit him to go to investigate it and to report on the possibility of arranging plans by which the two observatories might co-operate.

On January 24, 1911, the 37½-inch reflector was ready for trial, but the night was not clear. On January 27 telegrams were exchanged with the La Plata representative in New York. The first spectrogram with the reflector, one of Capella, was made on January 31, 1911, and on February 5 at the Hotel Astor in New York a conference was held at which President Hutchins, Director Hussey, Lamont, and Ernest Nelson of the La Plata Observatory discussed plans of co-operation between the two observatories. It was proposed that Hussey hold the directorship of both and divide his time between the two. On February 23 the Regents approved his La Plata appointment, and on June 20 he boarded the "Voltaire" for South America.

Then followed several years during which he divided his time between the two institutions. During the year 1913-14 conversations were in progress with President Gonzalez to provide a larger telescope, "the largest in the world," at La Plata for spectroscopic work. "That

here [at Ann Arbor]," wrote Hussey, "and the Lamont refractor at Cordoba on the hill would make a fine combination." That combination, however, was not to be. The National University of La Plata met with financial reverses. In 1915 even the publications of its observatory were held up: the treasury was empty. On September 13 Hussey was summoned back to Ann Arbor by a cablegram from President Hutchins informing him of the serious illness of Mrs. Hussey, who died before he reached home. His directorship at La Plata ended in 1916.

In the meantime, work on the Lamont refractor was not forgotten. In 1911 a contract for a twenty-four-inch objective was given to Alvin Clarke and Sons. At about the same time glass was ordered from Parra-Mantois and Company of Paris, but it was not obtained. Two years later a duplicate order was placed with the German firm Schott and Genoesen. But up to the time of Hussey's last return from South America the glass had not been received. Mr. Lundin, the expert optician selected to make the lens, had died in 1915. The World War then intervened. During this period there was improvement in the production of optical glass in the United States, and at the end of the war the glass was ordered anew from an American firm. Three more years passed without success. In August, 1922, in response to an inquiry, Hussey learned that at Jena was a pair of unsold disks twenty-eight inches in diameter suitable for a twenty-seven-inch objective. The American firm kindly consented to cancel the order. Lamont authorized the purchase of the Jena disks, which were received by McDowell and Company at Pittsburgh in April, 1923. Because of the tragic death of J. B. McDowell, chief optician, there was another delay, but the work was completed by Hageman and the objective reached Ann Arbor on January 27, 1925.

Early work on the mounting had been done in the Observatory Shop by Henry J. Colliau and was halted in 1913 awaiting final information regarding the diameter and focal length of the objective. The larger lens necessitated a new tube, which was constructed at the Observatory Shop, and adapted to the mounting, which needed only minor changes. During the summer of 1925 the twenty-seven-inch Lamont telescope was fully assembled and temporarily mounted just south of the dome of the 37½-inch telescope for final testing. The preliminary optical tests had been carried out at Pittsburgh, and the final test at Ann Arbor on star images, including selected double stars, proved entirely satisfactory. Tests made by Heber D. Curtis on the lens in the optician's works at Pittsburgh showed that it might well be termed "perfect" as to figure, and this has been borne out by the subsequent performance of the telescope in South Africa. A large proportion of Rossiter's pairs are of separation only 0."25 to 0."20, and experts have pronounced the discovery and measurement of many of these pairs as "an extraordinarily severe test for any observer with any telescope even under the best observing conditions."

The southern site for the Lamont refractor had been carefully selected after thorough investigation by Hussey, whose long experience had made him an expert along this line. In 1903 he had studied "seeing" conditions in southern California, Arizona, and Australia for the Carnegie Institution, and it was largely because of his recommendation that Mount Wilson, California, was approved as the site for that institution's 60-inch reflector and likewise, later, of its 100-inch reflector. During his South American experience, conditions at La Plata were adequately known by his discovery of 312 double stars, and he had given fairly favorable consideration to a site near

Cordoba, Argentina. South Africa remained as a possible location, and in October, 1923, he left Ann Arbor, taking a ten-inch telescope with lens by McDowell, the mounting of the old six-inch telescope of the Students' Observatory at Ann Arbor, and a new tube. With this instrument he tested sites near Bloemfontein and Johannesburg and studied information received from reliable sources regarding other sites. He stated:

Dr. Innes, Director of the Union Observatory, recommended Johannesburg, or some place in its vicinity. The late Sir David Gill, for many years Director of the Royal Observatory at Cape Town, Colonel Morris, long associated with the South African Geodetic Survey, Dr. Halm, Acting Astronomer at Cape Town, and Senator A. W. Roberts of Lovedale, all recommended Bloemfontein, the capital of the Orange Free State. (Hussey, MS, "Lamont-Hussey Observatory.")

Tests with the ten-inch telescope during December and January, 1923-24, confirmed these recommendations, and Naval Hill was finally selected. The site is within the city limits of Bloemfontein about two miles north and three hundred feet above the business section.¹

In August, 1926, the Lamont refractor was shipped for Bloemfontein, and on October 9 Hussey, accompanied by Mrs. Hussey and Richard A. Rossiter with his family, sailed from New York. In London on October 28, 1926, while Professor Hussey was at dinner with friends, occurred his unexpected death, the most severe blow received by the southern project of the University of Michigan and a tragic ending of a lifelong dream just to be realized. S. W. Burnham, another famous American double-star observer, paid a fitting tribute when he said that Hussey's record in all fields of double-star work was brilliant and that

it would not be forgotten as time went on.

Ralph Hamilton Curtiss, who came to the Observatory in 1907 and was in charge during Hussey's many absences, succeeded him, first as Acting Director, and then, in March, 1927, as Director of the Observatory. Also, immediately upon the death of Hussey, he was placed in charge of the Lamont expedition to South Africa. It was decided that the work should proceed under Rossiter, who continued from London and arrived at Bloemfontein November 28, 1926. A fifty-six-foot dome by Fecker of Pittsburgh and some accessories were shipped the following October.

Plans for the Lamont-Hussey Observatory Building were made by W. S. Lunn, engineer, of Bloemfontein, and the construction was let to a local firm there, W. H. Birtand Sons. Another Bloemfontein company, Gillespie and Son, erected the dome. Many favors were extended by the municipality, including a practically free site, road construction, water and power at cost, and a residence for Rossiter at one dollar rent per year.

The Lamont-Hussey Observatory building consists of the circular telescope room, fifty-six feet in diameter, and a north and a south wing. The central part is covered by the large dome of the twenty-seven-inch refractor. The south wing contains the library, three offices, a restroom, a storeroom, and a darkroom. The north wing provides quarters for the caretaker and for garage and storage purposes. The steel dome weighed fifty-eight tons when it was crated for shipment. It is rotated by a five-horsepower motor with a control at the switchboard and another within reach of the observer at the telescope. An observing chair twenty-seven feet high and of light steel construction, also built by Fecker, was provided to take the place of the elevating floor originally planned.

¹ The exact location was finally decided by Rossiter after Hussey's death.

The twenty-seven-inch objective of the Lamont refractor has a focal length of 40 feet and $7\frac{1}{2}$ inches from the rear surface of the crown-glass component. The combination of crown and flint disks is corrected for visual light. The bronze cell designed by Colliau permits relative rotation of the disks for possible improvement of definition, which has not yet been deemed necessary. A few changes from the Warner and Swasey design for the mounting were made, including a differential slow motion in the drive, and a small increase in the thickness of the steel sheets of the tube to decrease the amount of flexure. The micrometer was patterned after the Warner and Swasey micrometer of the University's twelve-inch refractor at Ann Arbor, with improvements suggested by Hussey and made in the Observatory Shop. The adopted value of one turn of the screw is $10''.540$. Ten eyepieces giving magnifying powers from 240 to 1,760 are provided.

Morris K. Jessup and Henry F. Donner sailed from New York October 1, 1927, to assist Rossiter with the double-star program. The Lamont-Hussey Observatory was dedicated on April 28, 1928, with guests present officially representing the Orange Free State, the city of Bloemfontein, and the Boyden Station of Harvard University. The staff formally began its work, carrying out in detail the plans originally formulated by Hussey. The following account of the program, its progress, present status, and future plans, was submitted by Rossiter, June 30, 1937, who remains as Michigan's only representative to carry to completion the comprehensive plans of Hussey's dream and Lamont's benefaction.

Former double-star programs customarily carried the systematic examination of stars through 9.0 or 9.1 catalogue magnitude. The searches at the Lamont-

Hussey Observatory have been extended to include 9.5 catalogue magnitude. The majority of the charts from which the searches have been made were plotted to that magnitude at Ann Arbor under the direction of the late William J. Hussey. The part of the southern sky not covered by these charts is represented by charts used by Hussey at the Lick Observatory of the University of California or at the Argentine National Observatory at La Plata. Additional stars have been plotted at Bloemfontein on these old charts, and in many cases wholly new charts have been prepared. The search files of the Lamont-Hussey Observatory now contain 1,875 charts of the southern sky from -10° declination to the south pole in bands of declination four degrees wide. Each chart from -10° through -65° is 12^m of right ascension wide by 4° of declination long. South of -65° the charts are of 24^m or 36^m of right ascension wide. The chart method has always been used at the Lamont-Hussey Observatory in searches, researches, and in remeasures. An observer using the chart method needs no assistant in the dome while he is working. The original searches and researches, and remeasures in the same or adjacent bands, are carried out very expeditiously and conveniently by a single observer by this method. The Lamont twenty-seven-inch refractor has no installed fine circles and thus far has not seriously needed them. Only a widely scattered group of double stars to be remeasured would make fine circles more convenient than the chart method.

Since all known southern double stars are indicated on these 1,875 charts, the total file represents a location catalogue of southern pairs. Of the more than 15,000 double stars thus entered on these charts 5,650 were found at the Lamont-Hussey Observatory during the period May, 1928—May, 1937. In addition to

this chart catalogue there are two card catalogues of Lamont-Hussey Observatory double stars, one in order of right ascension for all the 5,650 pairs and the other in order of right ascension in each four-degree band. All measures are entered on both sets of cards. Since both searching and measuring is carried out by four-degree bands, the second card catalogue is most convenient for first record and for entry into the first card catalogue. The first card catalogue is most convenient for publication and for general entry or comparison with published lists or measures.

Three observers have been responsible for finding the 5,650 Lamont-Hussey Observatory pairs. Morris K. Jessup, working during the period May, 1928—July, 1930, is credited with 854 new double stars; Henry F. Donner, May, 1928—May, 1933, with 1,057; and Richard A. Rossiter, May, 1928—May, 1937, with 3,739. Each observer has been held responsible for securing sufficient measures of his own double stars to form, and furnish for double-star observers, a first epoch with which later measures might be compared. Only when some orbital motion is shown by a later epoch of measures does a double star become of especial interest to double-star observers. By January, 1930, 2,550 Lamont-Hussey Observatory double stars had been thus measured for a first epoch. To May, 1937, and particularly during 1935 and 1936, an additional 2,600 pairs have had first epochal measures. The remaining 500 double stars have had measures on only one night or need more measures to give a good first epoch.

Approximately 80 per cent of the southern sky has been searched at the Lamont-Hussey Observatory during the period May, 1928—May, 1937. By means of part-time searches during the following three years the remaining 20 per cent should be finished. Plans for the

five years ending in June, 1942, call for completion of the first epochal measures of all Lamont-Hussey Observatory pairs and as many second epochal measures as possible, an estimated 80 per cent of the total final list.

Of the 5,650 new double stars, 44 per cent are not fainter than 9.1 catalogue magnitude. The discoveries of the past two years still maintain approximately that percentage of standard search doubles. The number of faint close companions is greater than that in most lists of standard new double stars, and represents pairs only observable under reasonably good conditions of transparency and steadiness.

The magnitude-separation formula, adopted as a basis for determining which apparent double stars are to be retained in the files as Lamont-Hussey Observatory pairs, is as follows: $\log p'' = 2.5 - 0.2m$, where p'' is the separation in seconds of arc and m is the combined visual magnitude of the two components of the double star. This formula allows a separation of 8.''0 for an 8.0 visual magnitude pair; 5.''0 for a 9.0; and 3.''2 for a 10.0. Of the 5,650 Lamont-Hussey Observatory pairs, 94 per cent fall within the limits of separation set by this formula, and the remaining 6 per cent are borderline cases which have been retained if their separations are not greater than one-third wider than called for; 22 per cent of the 5,650 pairs are not wider than 0.''5, 15 per cent are wider than 3.''0, and the remaining 63 per cent thus have separations in the range from 0.''5 to 3.''0.

In the majority of cases the combined visual magnitudes of the Lamont-Hussey Observatory double stars have been determined by Rossiter with an iris diaphragm attached to the four-inch finder of the Lamont twenty-seven-inch refractor. The apertures used for the various magnitudes have been standardized by

means of the Harvard photometric stars found in the *Henry Draper Catalogue*. For stars with components separated more than $3''.5$ the magnitude of the primary component seems to be given by the iris diaphragm; for components closer than $2''.0$ or $1''.8$ the magnitude is that of the combined light of the two components. For separations ranging from $2''.0$ to $3''.5$ an adjusted value between the combined light and the light of the primary seems best to represent the magnitude of the components as seen in the twenty-seven-inch refractor. Difference of magnitude between the two components must of course be estimated only in the large telescope.

No complete measures of any Lamont-Hussey Observatory pairs have yet been published by the University of Michigan or by the Lamont-Hussey Observatory. Single-line announcements for each double star, including an approximate measure, have been published in the *Memoirs of the Royal Astronomical Society* for 5,250 pairs, 2,232 in 1933 and 3,018 in 1936, in sections of Volume 65. Four hundred more are soon to be announced in similar manner. At the completion of the search and measuring program the University of Michigan will publish the whole list of Lamont-Hussey Observatory double stars, together with their first and second epochal measures, in a "Hussey Memorial Volume" in commemoration of one of the great double-star astronomers of the world, the late William Joseph Hussey, whose name is coupled with that of the Honorable Robert Patterson Lamont, the original donor of the Observatory and its great telescope.

The financial support of the Lamont-Hussey Observatory for the five years

ending in June, 1933, came chiefly from the donor. Every assistance to the expedition was given by the government of the Union of South Africa and that of the Orange Free State, as well as by the municipality of Bloemfontein. It has been estimated that such assistance, in the form of a residence for Rossiter and low, fixed charges for electricity and other services, amounted to fully 10 per cent of the yearly expenses, and these have been cheerfully given from the beginning of the expedition until April, 1937, when an even more liberal measure of support was provided. From 1933 until April, 1937, the University of Michigan assumed the financial responsibility.

For the five-year period April, 1937—March, 1942, the municipality of Bloemfontein furnished the total financial support for carrying on the Lamont-Hussey Observatory from a fund 80 per cent of which was furnished by the government of the Union of South Africa and 20 per cent by the municipality. By agreement the University of Michigan retained full ownership of the Observatory, of its equipment, of its observing program, and of the results secured, and has the financial responsibility of publishing the "Hussey Memorial Volume" at the completion of the observing program. Suitable acknowledgment is to be made in the final published volume for the financial support given by the municipality of Bloemfontein and the government of the Union of South Africa. The agreement thus allowed the Lamont-Hussey Observatory to carry on its program according to the plan pursued during the period May, 1928—March, 1937, an agreement remarkable in its liberality of view and freedom from restrictions.

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THE MC MATH-HULBERT OBSERVATORY

THE McMath-Hulbert Observatory of the University of Michigan commenced operations on July 1, 1930. Before that date lay the history of the idea and its evolution from even smaller equipment than that available at the time.

It is probable that Mr. Willard Pope ('88e) of Detroit, vice-president of the Canadian Bridge Company of Walkerville, Ontario, interested the president of the company and his business associate, Mr. Francis C. McMath (C.E. Washington University '87, Hon. Alum. Michigan '31, D. Eng. hon. Wayne '37), in astronomy during the early 1920's. McMath's interest led to the acquisition of a series of small telescopes, the first of which was a three-inch altazimuth obtained in 1922. Since the mounting of these telescopes proved unsuitable, in 1926, after some urging on the part of his son, Robert R. McMath ('13e, A.M. hon. '33, D.Sc. hon. Wayne '38), president of Motors Metal Manufacturing Company of Detroit, F. C. McMath purchased a four-inch Bausch and Lomb refractor equatorially mounted and driven by a spring clock. Experience showed that this instrument could not be used satisfactorily out in the open, and, consequently, in 1927 R. R. McMath designed and built a suitable dome to house

it. The spring clock was found reasonably satisfactory for short periods, but its rate was not sufficiently constant to keep the setting circle in proper position for the longer observations. It occurred to F. C. McMath that a telechron motor could be used for the clock drive instead of springs, and R. R. McMath undertook to design and build a sidereal clock with such a motor. This was installed early in 1928; it performed perfectly, and all clock troubles were at an end.

That summer R. R. McMath conceived the idea that the moon should prove an interesting subject for celestial motion pictures. He took such a picture, holding his own sixteen-millimeter motion-picture camera by hand against the eyepiece at an approximation of the telescope focus. After development, a fairly clear image of the moon appeared, and the picture showed that the idea had promise.

These motion pictures came into the hands of the late Director Ralph H. Curtiss of the University of Michigan Observatory through Henry J. Colliau of the Observatory staff. As a result of the vision and energy of Professor Curtiss, Messrs. F. C. and R. R. McMath agreed to undertake the design of an instrument especially adapted for the production of celestial motion pictures. It is

a matter of great regret that Curtiss did not live to see the plan come to fruition.

In 1929 Judge Henry S. Hulbert (LL.M. hon. '14, LL.D. Wayne '36), long interested in astronomy, joined the enterprise. At that time he was the senior Judge of Probate of Wayne County, Michigan, and has since (1935) become vice-president of the National Bank of Detroit in charge of the trust department.

The Regents of the University of Michigan, in June, 1929, appointed Messrs. R. R. McMath, F. C. McMath, and Judge Hulbert honorary curators of astronomical observation, at the request of Dr. R. H. Curtiss. This was done in order to make possible close relations between the new observatory at Lake Angelus and the University of Michigan Observatory. Later, the titles of these curators were changed (see p. 487).

The observatory, which commenced operations on July 1, 1930, comprised a 10½-inch equatorial, mounted on a very heavy Bruce-type mounting with all of the auxiliaries thought necessary at that time. This observatory was described by the three founders in the *University of Michigan Observatory Publications* (Vol. 4, No. 4, 1931). Shortly thereafter, Heber Doust Curtis accepted the directorship of the University of Michigan observatories (see Part III: DEPARTMENT OF ASTRONOMY AND ASTRONOMICAL OBSERVATORIES AT ANN ARBOR), and this proved to be one of the most fortunate events in the history of the enterprise. His unbounded enthusiasm and faith in the undertaking have been a continued inspiration to the founders. Dr. Curtis suggested that the name of the new observatory at Lake Angelus be the McMath-Hulbert Observatory, and in 1931 the three founders deeded it to the University of Michigan, for it had become apparent that the work should be carried on under University auspices.

The years 1931-33 were spent in perfecting the necessary mechanical equipment with which to take successful celestial motion pictures of the planets and of the shadow changes on the moon. The purely educational value of the pictures had previously been regarded as of paramount importance, but their scientific value was becoming more and more evident as time went on. Accordingly, in 1931 it was decided to try similar photographic work with the sun as a subject. Kevin Burns of the Allegheny Observatory was consulted as to the optics involved, and F. C. McMath furnished the funds with which to acquire the optical parts of the new instrument, which was christened by Dr. Curtis the "spectroheliokinematograph."

This instrument was attached to the eye end of the 10½-inch reflector in June, 1932, after having been constructed by Messrs. Colliau and Smock in the University Observatory Shop from detailed drawings made by Curtis. Robert M. Petrie of the University staff spent the summer at Lake Angelus assisting in an effort to make the spectroheliokinematograph function. Spectroheliograms of solar prominences were secured that summer, but the first striking complete record was made of the ejection of a large eruptive-type prominence from a rather small sunspot on June 19, 1934, by Messrs. R. R. McMath and Petrie.

In the meantime, R. R. McMath had been building and discarding telescope drives and controls in an effort to secure one which would be nearly perfect. A very successful drive which utilized the method of frequency changing had been evolved by the summer of 1933. It became evident, however, that if extensive solar work were to be carried on, still further improvements were needed. The Detroit Edison Company joined with the observatory late in the summer of 1933 in an endeavor to evolve a satisfactory

drive for the telescope which should be independent of the power system's line-voltage fluctuation and frequency variations. On December 1, 1933, the final drive was installed at Lake Angelus. Its fundamental element was a synchronous motor the speed of which could be varied by means of frequency variations in the current, effected with a thermionic tube control. Worm gearing only connected the motor to the telescope. This drive proved itself to be everything that could be desired and has been adopted for other telescopes at other observatories.

Between 1930 and 1934 Director Curtis had shown the pictures taken at the McMath-Hulbert Observatory before many audiences, both scientific and popular, and through the University of Chicago Press the pictures secured a wide distribution all over the earth. The work was closely watched by the scientific world, and professional astronomers were generous in their praise.¹ This early success was recognized by the Franklin Institute of Pennsylvania, which awarded the three founders the John Price Wetherill medal in May, 1933, "for their design and construction of novel apparatus for the making of motion pictures of astronomical subjects."

The reception of the solar motion pictures led R. R. McMath to suggest a solar tower telescope. With the help of President Ruthven, \$20,000 was secured from the Rackham Fund as an initial grant. R. R. McMath and his brother, Neil Cook McMath (C.E. Cornell '14), then made an extended tour of inspection to other observatories, and in particular

to Mount Wilson Observatory. All possible aid was given by the scientists at these observatories. It developed, however, that it would be most desirable to build an instrument which would take world rank as to size and light grasp. Soon after the McMaths' return from their trip, the founders of the McMath-Hulbert Observatory and H. D. Curtis held a conference and decided to proceed with plans for such an instrument. It soon became obvious that the cost of the instrument would greatly overrun the initial grant. A very substantial grant was then obtained from the McGregor Fund of Detroit, and in addition a number of individuals made generous contributions.

The resources available for design and construction proved to be particularly fortunate. R. R. McMath was president of the company in whose shops the 10½-inch instrument, with its complicated accessories and other equipment, had been built. Neil C. McMath was vice-president of the Whitehead and Kales Company of Detroit, one of the larger steel fabricators of this section of the country. Edison Pettit, of the Mount Wilson Observatory, put his accumulated experience in solar physics and solar observation unreservedly at the disposal of the McMath-Hulbert Observatory. Every effort was made to avoid mistakes which had been made in the past.

Ground for the new tower telescope was broken on July 16, 1935, and the instrument was completed, except for temporary optical parts, on June 30, 1936. A description was published in the *University of Michigan Observatory Publications* (Vol. 7, No. 1, 1937). Fortunately, the founders had purchased enough optical pyrex from the Corning Glass Company late in 1934. This alone permitted the work to be undertaken as soon as it was. Nevertheless, certain parts of the optical equipment were not

¹ Late in the fall of 1933 the late Tracy W. McGregor became interested and made a generous grant for the operation of the observatory for the calendar year of 1934. It would be difficult to evaluate the importance of this event, as the later growth of the observatory would have been impossible without the help of Mr. McGregor and of the trustees of the McGregor Fund. To our great sorrow, Mr. McGregor did not live to see the observatory reach its present stature.

ready at the end of June, 1936. Director W. S. Adams, of the Mount Wilson Observatory, thereupon loaned the McMath-Hulbert Observatory sufficient optical equipment with which to begin its program. Even as late as May, 1937, the observatory had not yet received its own six-inch diffraction grating and was still using one loaned by the Mount Wilson Observatory.

Edison Pettit accepted an appointment as a research associate of the McMath-Hulbert Observatory in June, 1936. He spent July and August supervising the observational program at Lake Angelus. Although it had been hoped that the results would be unusual, no one had even imagined such results as were actually secured. Certain phenomena which the astronomer had only strongly supposed to exist he could now, for the first time in astronomical history, see as often as desired and examine minutely. The results of measurements of the first summer's negatives are described by R. R. McMath and Edison Pettit in the *Astrophysical Journal* (Vol. 85, No. 4, 1937).

The light-pressure theory which has been advanced, particularly in England, in explanation of the solar prominences, appears to have been disproved by the observations of 1936. The films indicate that a source of chromospheric material exists high above the solar surface, and suggest strongly that there is a solar atmosphere, notwithstanding that all eclipse evidence seems to deny its existence.

In the winter of 1936-37 some alterations to the instrumentation and some important additions were made. The changes and additions were the result of one year's use of the instrument and were, in the main, evolutionary in character.

Dr. Edison Pettit continued as research associate and spent June, July,

and August, 1937, at the observatory assisting with the observational program. The results of the summer's observing, together with more observations by McMath and H. E. Sawyer in the autumn, were described in *Mount Wilson Contributions*, No. 597. The tower performed with perfect satisfaction during its second summer, so that only minor changes in the instrumentation were made during the winter of 1937-38, the principal one being the design and construction of an auxiliary photoelectric guiding apparatus.

Dr. Pettit was again at Lake Angelus observing with the tower telescope during the summer of 1938. Measures of the records of the previous summers had made it evident that motions perpendicular to the line of sight, deducible from the customary spectroheliograms obtained with the tower telescope and the spectroheliokinematograph, could tell only a part of the story of motions on the sun. Accordingly, Sawyer and George Malesky spent the summer evolving a technique for measuring the motions of prominence material along the line of sight, using the 10½-inch equatorial and its spectroheliokinematograph.

It was found that the velocities at all points of an area under observation could be determined by giving a suitable motion to the slits of an orthodox spectroheliograph. The necessary motions were obtainable only in an instrument of special construction, and Mr. Julius F. Stone of Columbus, Ohio, made a grant of \$10,000 to the observatory for the design and construction of the new radial velocity spectroheliograph.

The Stone radial velocity spectroheliograph was built in the winter of 1938-39, and its installation in the tower telescope just to the north and above the main spectroheliograph was completed by November, 1939. A complete optical system, using the existing driving and

controlling mechanisms, was added to the fifty-foot tower for directing and focusing sunlight on the Stone spectroheliograph.

At the close of the summer of 1938 Dr. Pettit felt that he had accomplished his work at the observatory, and he accordingly did not participate in the observing in the summer of 1939. During the 1939 observing season the first strictly simultaneous records of the motions of solar prominences in light from two different elements, calcium and hydrogen, were obtained; and also in this observing season the first pictures of the actual beginnings of two prominences were made.

For some time past, Judge Hulbert, Director R. R. McMath, and his father, Francis C. McMath, had discussed plans for the general enlargement of the observatory. Inasmuch as the tower telescope had become a proved success, the field for the spectroheliokinematograph, mounted as it was on the 10½-inch equatorial, was very limited. Upon the death of F. C. McMath on February 13, 1938, it was decided that the 10½-inch should be replaced with a memorial twenty-four-inch equatorial telescope. The work on the design and manufacture of the Francis C. McMath twenty-four-inch reflecting telescope was started early in 1939, and the instrument was practically completed by June 30, 1940. It has been described in the *Publications of the University of Michigan Observatory* (Vol. 8, No. 6).

Throughout the regime of Heber D. Curtis the curators, who at his request were newly designated honorary curators of the astronomical observatories of the University of Michigan, have served as an advisory board. Neil C. McMath took his father's place as a curator in March, 1938. Before the end of the year R. R. McMath accepted the directorship of the McMath-Hulbert Observatory, and Wil-

lard Pope soon afterward replaced him as an honorary curator.

The simultaneous recording of prominence motions in three dimensions and in the light of different elements showed the great desirability of adding still another simultaneous record, that of the energy changes in prominences and other solar features. Preliminary designs by Director McMath for a new instrument indicated that at least a seventy-foot tower telescope would be needed, and tentative plans for a new telescope and an office building to house the staff, provide a library, darkrooms, laboratory facilities, and, probably most important of all, a suitably equipped instrument shop, were drawn up. In September, 1939, the McGregor Fund made a grant to the University of Michigan of \$100,000 and Mr. and Mrs. R. R. McMath deeded the necessary land to carry out these plans. The new building was dedicated on May 25, 1940, together with the tower telescope structure (without instrumentation). Work was immediately started on the new McGregor instrument, and the new tower telescope was in service by the end of 1941.

The completion of the McGregor Tower perfects the Lake Angelus equipment to the point where concurrent observations of space motion and of the energy in solar activity can be made with ease and precision. Experience gained in making the simultaneous records in hydrogen and calcium light and the simultaneous radial velocity records indicates that such concurrent observation has many times the value of an isolated record.

Although the new concurrent observations will supersede, in many ways, the original "one-variable" observations, several important results have emerged from the early motion pictures of solar prominences. For the first time, astronomers have been able to see the

motions of prominences projected on the disk of the sun, and these pictures, as well as the pictures of prominences projected on the sky, show conclusively that 95 per cent of the material in prominences is moving downward to the sun.

The beginnings of simultaneous observations have enabled us to demonstrate pictorially, and by measurement, that the gases which compose a solar prominence are perfectly mixed and in some instances to derive the geometrical relations of the prominences to definite points on the surface of the sun. Based on these first results of the method of concurrent observations, new instruments have been evolved, a staff of astronomers has been organized to do co-operative research, and a novel program for continued investigation and observation of the sun has been developed.

The phenomenal growth of the observatory to an "institution responsible for one of the greatest developments of the decade—the continuous record of the motions of the solar atmosphere" has required the close and enthusiastic co-operation of many individuals.

H. E. Sawyer and O. C. Mohler, assistant astronomers, together with J. T. Brodie, assistant, comprise the present scientific staff. Messrs. Sawyer and Brodie have been at Lake Angelus since late in 1933. Dr. Mohler, after a close association with the observatory which

began in 1933, joined the staff permanently in 1940. C. W. Guenther, instrument maker, and two machinists, under the supervision of engineer George Malesky, are engaged in completing the instruments for the McGregor Tower at Lake Angelus.

The three founders of the observatory—R. R. McMath, Judge H. S. Hulbert, and F. C. McMath—have been completely responsible for the organization of the observatory. Judge Hulbert has been an invaluable aid to the observatory whenever his many duties would permit his participation in its activities; and until his death Mr. F. C. McMath contributed from his long engineering experience freely and generously in the design of buildings and new instruments. His advice and counsel in all matters pertaining to the observatory have been greatly missed during the last three years. From the earliest beginnings of the observatory, Dr. R. R. McMath has been directly responsible for the design and construction of all of the instruments and buildings and has, in addition, initiated and supervised the research of the observatory.

ROBERT R. McMATH
FRANCIS C. McMATH*
HENRY S. HULBERT

* Much of the above history was written by the late Francis C. McMath. It has been brought up to date by Messrs. R. R. McMath and H. S. Hulbert.

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METEOROLOGICAL INSTRUMENTS AND THE TEACHING OF METEOROLOGY

THE Regents' report to the superintendent of public instruction in 1849 incorporated a statement by the Board of Visitors regarding the lack of "philosophical apparatus." The importance placed on meteorology is evident from the following excerpt:

. . . Not an instrument, even, for Meteorological purposes, is to be found in their [the Regents'] inventory, notwithstanding the subject is becoming every year one of increasing interest to the scholar and poetical [practical?] man, and awakens the attention of our national and other Legislatures. (*R.S.P.I.*, 1849, p. 45.)

Lectures on meteorology and climate were announced in the *Catalogue* for 1852-53 under the heading, Chemistry, as follows: "During the Third Term a special course will be given to the Agricultural Class—also Lectures upon the subjects of Meteorology and Climate." An unfilled professorship of theoretical and practical agriculture was also listed. In 1853-54, under Agricultural Course, the following course was announced: "Lectures on Chemistry, Chemistry applied to the Arts, Meteorology and Cli-

mate." These were evidently given by the Reverend Charles Fox (A.B. and A.M. Oxford), Lecturer on Theoretical and Practical Agriculture, who was appointed Professor for 1854-55. His death, which was recorded in the *Catalogue* of 1854-55, occurred in July, 1854, and caused a suspension of the lectures which was then considered only temporary. The prospect of finding an immediate successor was apparently given up in 1861-62, when the unfilled professorship was canceled from the faculty list, but, to judge from the statement in the *Catalogue*, the hope of providing a complete agricultural course survived until 1863.

The interest in meteorology did not fail, however, because of its association with the ill-fated agricultural course. Meteorological instruments were included in the purchases made with the Regents' approval in 1854 by Alexander Winchell, Professor of Physics and Civil Engineering. His account for instruments in June of that year totaled \$500. An additional sum of \$500 was appropriated, which he exceeded by \$135.75. The following action was recorded in October:

A memorial was received from Professor Winchell stating that the University is now in possession of a complete suite of Meteorological Instruments and recommending that some provision be made for the keeping of a regular record of Meteorological Observations at the University. Whereupon, it was ordered that Professor Winchell procure a bound blank book ruled according to the forms issued by the Smithsonian Institution and keep therein a record of regular Meteorological Observations at the University. (*R.P.*, 1837-64, p. 575.)

In accordance with this action, records were made by Winchell from 1854 to 1857 and were sent to the Smithsonian Institution for publication. In 1852 Dr. H. R. Schetterly made meteorological records at Ann Arbor; also, from 1852 to 1856, Lum Woodruff made such records three and one-half miles east of Ann Arbor. According to Winchell, the records by these observers were published by the Smithsonian Institution. The Winchell Papers in the University archives contain a large amount of meteorological data from other stations in Michigan, some for dates as early as 1823, as well as records from distant parts of the United States, both east and west. These records include temperature, rainfall, barometric pressure, wind, clouds, and humidity. Meteorological tables for several stations in Michigan give means by months during several years for the chief meteorological elements.

In Regent Hubbard's compilation of bylaws (*Bylaws*, 1922, p. 67) is contained the statement: "The Director of the Observatory shall have charge of the Observatory and of the astronomical and meteorological instruments and apparatus."

Mark Walrod Harrington, third Professor of Astronomy and Director of the Observatory, 1879-91, gave much attention to meteorology, including the teaching of the subject, the securing of instruments, and the keeping of records (see

Part III: DEPARTMENT OF ASTRONOMY). In the University *Calendar* for 1879-80 a two-hour course designated as General Meteorology was announced. Later the course was called Modern Meteorology and an elementary course in physics was made a prerequisite. Eight students enrolled in meteorology for the first semester of 1880-81. Some conception of the importance assigned to meteorology is conveyed by the heading, "Astronomy and Meteorology," in the University *Calendar* of 1885-86, above the description of courses in the Department of Astronomy.

In response to Harrington's request soon after his arrival, \$850 was appropriated for meteorological instruments. He secured a Hough's barograph, a Hough's thermograph and an anemograph of St. Gibbon's pattern for wind velocity and direction. From the United States Signal Service he obtained a standard thermometer, a psychrometer, a terrestrial-radiation thermometer, and a solar-radiation thermometer. Tridaily records of the barograph, thermograph, and anemograph were reported to the State Board of Health at Lansing. Harrington stated in his report to the Regents for the period October 1, 1879-January 1, 1881, that continuous records of the three most important meteorological elements had never before been made at Ann Arbor, and, excepting a record of the velocity of the wind, never before in Michigan, so far as he knew. The report was composed of detailed observations, grouped under the three headings indicated in the following summary:

1. The climate of Ann Arbor (temperature, relative humidity, barometer, clouds, ozone, precipitation, and direction and velocity of wind). The rainfall for 1880 reached forty-four inches, which was unusually large, as the yearly average for Ann Arbor was about thirty-six

inches. In the special table, "Gales at Ann Arbor during 1880," the wind direction, duration, and maximum velocity were correlated with the change of temperature, with barometric pressure, and also with the relative humidity, cloudiness, and kind of clouds. The relationship between the conditions at Ann Arbor and the weather of the United States in general was shown in an interesting column, in which was noted especially the association with low-pressure areas in different parts of the country.

2. The diurnal fluctuation of the meteorological elements. It was found that the wind velocity fluctuates very much as the temperature does, that, on the average, the wind is lightest at about sunrise, increases rapidly in velocity till noon or soon after, and then falls rapidly until sunset, and after that slowly through the night until it reaches its minimum at about sunrise.

3. The character of local storms. Thunderstorms, hailstorms, and squalls of brief duration were here described, and correlated with the chief meteorological elements. In a special analysis of a sudden thunderstorm the following conclusion was reached:

... The squall accompanied a small high pressure center, the upper part of which—represented by the cloud—was a little in advance of the lower. This column of heavier air was accompanied by heavy rain and vivid electric discharges, which extended out from it but a short distance. From the base of the column the air was pouring out radially in all directions. (Harrington, p. 19.)

Meteorological records that Harrington began in January, 1880, and continued until the end of his administration, were copied by William J. Hussey in a volume now kept at the Observatory. Harrington added to the equipment two small seismoscopes which indicated only the time of occurrence of seismic disturbances. In 1884 he established

the *American Meteorological Journal*. He made many contributions to this journal, and served as its editor until 1892.

Harrington was granted a leave of absence from the University in June, 1891, for the first semester of the following year. He went to Washington, D.C., to reorganize the meteorological work of the Federal Government, and on July 1, 1891, became first Chief of the Weather Bureau. The course Modern Meteorology was bracketed (to be omitted) in the *Calendar* for 1891-92 because of his absence, and since that time has not been offered in the Department of Astronomy.

In 1909-10 Elementary Meteorology, a two-hour course developed by Irving Day Scott (Oberlin '00, Ph.D. Michigan '12), Instructor in Physiographical Geology, was first taught in the Department of Geology.¹ It was an elementary treatment of the dynamics of the atmosphere, including properties and movements of the atmosphere, weather and its variations, and some account of weather prediction, and was designed for prospective teachers of physical geography in the high schools. Physiography 3 was a prerequisite. In 1920-21 one of the two elementary geology courses was "strongly advised" for students entering Physiography 3, and a year later three preliminary courses were required, making a sequence of four prerequisite to Elementary Meteorology. By 1923-24, however, this long sequence of prerequisites ceased to appear in the *Catalogue*.

The beginning, growth, and separation of courses in geography by the side of courses in geology from 1914 to 1923 had little or no effect on Elementary Meteorology except a change in course numbering. In the high school, however, physical geography has been displaced

¹ The section on instruction in meteorology in the Department of Geology has been supplied by Professor Irving D. Scott.

to a large extent by other subjects, and consequently, although the course in meteorology continues to be offered at the present in the Department of Geology, the demand for it has undergone a slight decline. The subject has recently been taken over by Ralph Leroy Belknap ('23e, Sc.D. '29), Assistant Professor of Geology, who has worked two seasons in Greenland on upper-air circulation (see Part III: DEPARTMENT OF GEOLOGY).

During the directorship of Asaph Hall, Jr., 1892-1905, meteorological records were continued, and were sent to the Michigan State Board of Health. In 1905 this board discontinued its meteorological work. William Joseph Hussey, Professor of Astronomy and Director of the Observatory from 1905 to 1926, adopted the system of meteorological observations of the United States Weather Bureau, and in 1907, upon his recommendation to the Regents, President Angell took up the question and secured the establishment of a United States Weather Bureau station at the Observatory. Some of the old meteorological instruments needed repair—for example, a heavy wind had carried off the anemometer balls and had broken the shaft. New instruments were also purchased to complete the equipment necessary to make records in accordance with the government requirements. The work of the station has continued to the present time.

Necessary changes have been made in the time and method of recording the observations. To 1905 they were made at 7:00 A.M., 2:00 P.M., and 9:00 P.M., in accordance with the method adopted by the Michigan State Board of Health. The Weather Bureau observations, made twice a day, at 7:00 A.M. and 7:00 P.M., include barometric pressure, air temperature, relative humidity, direction and velocity of the wind, precipitation, and

cloudiness. Records are also kept of the daily maximum and minimum temperatures and of such extraordinary phenomena as severe thunder and lightning, dense fogs, heavy frosts, ice storms, dust storms, auroras, and seismic disturbances.

Regarding meteorological equipment, Hussey stated in 1912:

Continuous instrumental records are also obtained of the velocity of the wind, as recorded by the anemometer; of the air temperature by a Richard thermograph; of the relative humidity by a Richard hygrograph and of the atmospheric pressure by a Richard aneroid barograph.

At the present time, as the hygrograph is not in use, the relative humidity is determined twice a day with the use of a wet- and dry-bulb sling psychrometer. The other instrumental records have been continued to the present time.

The regular meteorological observations are sent each month to the Lansing station of the United States Weather Bureau. From April 1 to September 30 each year the daily observations are telegraphed each morning to the Chicago station for the use of the Corn and Wheat Section. During the winter season a weekly report of the average depth of snow is sent to Lansing. Each morning a weather report is telephoned for publication in the *Ann Arbor Daily News*. The Observatory is thus continuing to contribute valuable public services through the use of its meteorological equipment.

The meteorological work at the Observatory is now conducted on the basis of a volunteer station. Because of the nearness of two primary Government Weather Bureau stations the relative value of the local work is not as great as it was in the time of Harrington.

W. CARL RUFUS

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THE DEPARTMENT OF BOTANY

THE PERIOD FROM 1837 TO 1855.—The first appointment to the faculty of the University of Michigan was that of Asa Gray (M.D. College of Physicians and Surgeons [N.Y.] '31, A.M. Harvard '44, LL.D. Michigan '87) in 1838 as Professor of Botany and Zoology. Because of insufficient funds and delay in building, however, students were not admitted until 1841. In the meantime Asa Gray obtained permission to visit Europe. He was paid two years' salary and was commissioned to purchase books for the Library to the extent of \$5,000. Only one botanical publication was included in this initial accession. It apparently was understood that Gray would supply books for the study of botany from his own library. Upon his return from Europe in 1839, he continued his studies in the East. In 1840, he agreed to a continuation of his appointment without salary, and in 1842, when it appeared that there was no immediate prospect of participation in the instruction, he resigned to accept an appointment at Harvard.¹

In 1842, Abram Sager (Rensselaer '31, M.D. Castleton Medical College '35, A.M. hon. Michigan '52) was appointed Professor of Botany and Zoology without salary until his teaching should begin. He had been associated with Douglass Houghton, who, as state geologist in 1837-38, conducted the first geological survey, which covered the two southernmost rows of counties. The botanical phases of the survey were handled by John Wright with the assistance of George H. Bull. Sager was responsible for the work on the fauna. Both Sager and Houghton had strong botanical interests. Houghton had been associated with Schoolcraft in his explorations in the upper Mississippi Valley and had published reports of his findings concerning the plants. Houghton and Sager made collections of plants which finally came into the University's possession.

The act of the state legislature authorizing the geological survey provided that the resulting collections should be deposited with the University. The Regents were apparently very much interested in the development of collections in the field of natural history. They author-

¹ For details concerning Asa Gray see the articles listed in the bibliography.

ized the use of one of the projected professors' houses for them until the main building should be completed (R.P., 1837-64, p. 70; see Part VIII: UNIVERSITY HERBARIUM for the history of the collections).

Doubtless these collections played a part in the selection of Douglass Houghton as Professor of Geology and Mineralogy in 1839. And in turn, Houghton probably recommended that his co-worker in the geological survey, Abram Sager, be the second Professor of Botany and Zoology. Sager, apparently, was expected to assist Houghton with the collections without pay. Sager at the time was a physician at Jackson.

It is difficult to determine when instruction was first given in botany. On April 17, 1845, the Regents requested Sager to give an elementary course in botany and zoology during the first two months of the next term and provided that "he be paid *pro rata* for the time engaged." In the *Regents' Proceedings* of August 5, 1846, it was stated that the resolution again authorizing Sager's employment during the spring term had not been carried into effect because he was unwilling to leave his professional business at Jackson, the compensation for the short period being inadequate. Biology courses before 1849 were evidently not as shown in the *Catalogue*, where botany was first listed for 1844 (winter term) and, after a two-year omission, reappeared as a half-term summer course. Actually, Dr. Sager taught an elementary course in botany and zoology through about one-half of the summer of 1845 and throughout the summer terms of 1847 and 1848. In the *Catalogue* of 1848-49 botany was listed as sharing the third term of the freshman year with zoology and was thus continued until 1852-53, when it was moved to the third term of the senior year under the title of Animal and Vegetable Physiology. The following descrip-

tion of the course was given in the *Catalogue* of 1852-53 (p. 35):

The instruction in this department [Zoology and Botany] will be communicated in a course of lectures during the third term of the fourth year, upon the general and comparative organization of plants, which forms the basis of their systematic arrangement or classification; and vegetable physiology, comprising the sources and mode of nutrition of plants, and their various modes of development and dissemination; also an outline of their geographical distribution and economical history.

A parallel course [in subject matter] on the general and comparative physiology of animals, their classification, habits and relation to human interests, will be given during the term.

Schleiden's *Principles of Botany*, Balfour's *Manual of Botany*, Gray's *Botanical Text-Book*, and Jussieu's *Elements of Botany* were given as books of reference for botany.

This course occupied a third of the time of senior students from April 1 to June 29. The first half of the term was apparently devoted to botany, and the second to zoology. Five lectures were given a week. It was required in both the classical and scientific courses. The fourth-year class in 1852-53 consisted of ten students, and in 1854-55, the last year Sager taught the course, sixteen.

In 1852-53 a course in agriculture was proposed in which instruction in botany was planned. In the 1853-54 *Catalogue* it was stated that instruction "will combine the principles and practise of farming; so as to impart a knowledge of everything connected with the subject except manual labor." Apparently some lectures concerning various phases of agriculture were given by Professor Charles Fox until his death in 1854. The plan for the development of instruction in agriculture was terminated by an act of the legislature in 1855 providing for the es-

tablishment of an agricultural college "within ten miles of the state capital."

In 1847, Sager with others successfully petitioned for the establishment of the Department of Medicine and Surgery, and in 1848 he was appointed Professor of Theory and Practice of Medicine in addition to his professorship of botany and zoology. In 1855 he resigned the latter to devote his full time to his professorship in the Medical Department. Sager's early interest in botany did not grow at the University, his most important contribution, outside of his teaching part of a course in the subject, being the gift of his herbarium in 1866.

THE PERIOD FROM 1855 TO 1877.—In 1855, Alexander Winchell (Wesleyan '47, LL.D. *ibid.* '67) became Professor of Botany, Zoology, and Geology. His scientific reputation was developed mostly in geology. The extent of his training in botany is not entirely clear. He had graduated from Amenia Seminary, Dutchess County, New York, where Erastus O. Haven taught natural science. From this association had arisen a friendship which was an important factor in bringing about Winchell's invitation later to join the faculty of the University. Winchell graduated from Wesleyan University, Middletown, Connecticut, in 1847. There is no evidence that he studied botany at that institution. The next year he taught natural science at Pennington Male Seminary in New Jersey. According to his two unpublished autobiographical sketches in the Michigan Historical Collections, he taught botany. He stated that he "entered with irrepressible zeal and delight upon the study of the flora of the vicinity by the aid of that admirable work, Darlington's *Flora Cestrica*" and from it he gained "an impulse which has never been lost, so much may be accomplished from an adequate and genial book." In 1849, he taught at Amenia Seminary, where botany became his fa-

vorite pursuit, almost to the exclusion of other fields of natural science. Here he collected and studied 706 species of plants upon which he based his only strictly botanical paper, "Catalogue of Plants . . . in the Vicinity of Amenia Seminary." From 1850 to 1853 he conducted two girls' schools in Alabama. He spent considerable time in studies in various fields of natural history. While head of the Mesopotamia Female Seminary at Eutaw, Alabama, he collected 435 species of plants (Winchell, MS, "Notebook"). The specimens apparently were sent to the Smithsonian Institution.

In 1854 Winchell came to the University of Michigan as Professor of Physics and Civil Engineering. He at once sought to find a place for himself in the fields of natural history. In so doing he apparently antagonized Silas H. Douglass, Professor of Chemistry, Mineralogy, and Geology. He also went directly to the Regents over the head of President Tappan, which doubtless did not lessen the antagonism that had developed between two incompatible temperaments and which unfortunately developed into a bitter feud. However, he achieved his purpose and was appointed Professor of Botany, Zoology, and Geology.

Professor Winchell introduced the laboratory method at the University in instruction in botany. Apparently this was optional at first. In the 1855-56 *Catalogue* the following statement occurs (p. 37):

Besides the instructions of the lecture room, the professor will afford facilities to those who desire them, for the more careful and minute examination and study of objects, the determination of species and the identification of formations. Short excursions will also be undertaken in term time, and longer ones in vacation for the purpose of bringing students into actual and direct communication with Nature.

A laboratory was established, as shown by the statement in the 1856-57 *Catalogue* that "such as desire it are permitted to engage in investigations under the eye of the Professor, in the Laboratory attached to this department."

According to the 1856-57 *Catalogue*, two courses in botany were offered. One was an elementary course, which followed an elementary course in zoology in the second semester of the junior year; the other was a course called Vegetable Anatomy and Physiology and the Principles of Classification, which was given as an elective course in the senior year. This class met three days each week. A similar course in zoology was given on alternate days, and it is stated that "at the option of the student either of the above courses may be omitted and a daily exercise made of the other." In 1864-65 the elementary course in botany was moved to the freshman year, in which it was taught for one-third of the semester.

The first mention of graduate study in botany was made in 1858-59. According to the *Catalogue* of that year (p. 43), advanced instruction was offered both semesters "in some of the departments of Zoology and Botany . . . to candidates for the Master's Degrees, and others possessing the requisite elementary information," and "this will include practical instruction in the use of the microscope and in the methods of anatomical research and a discussion of general principles of classification. . . . Students of these higher courses will be permitted to work with the Professor in the laboratory connected with the department and will receive such assistance as may be found necessary." Here is the first emphasis upon microscopy, which later became a major field of study. The advanced work in botany was apparently elective, since it was not listed among the required courses for the master's degree.

In 1873, Professor Winchell resigned

to become Chancellor of Syracuse University. This terminated his official connection with the teaching of botany at the University of Michigan, since on his return in 1879 he was appointed Professor of Geology and Paleontology. Although his main interests were in other fields, he did much to advance botanical instruction at the University. He developed two courses in which students were encouraged to study plants as well as books and, especially in the advanced course, to obtain botanical information through their own observations. He took an active interest in the development of the Museum and its collections. He reported that the botanical collections numbered 36,385 specimens upon his resignation in 1873. He strongly supported the theory of evolution. He was a leading member of the Methodist Church and did much to reconcile science and religion.

It is difficult to determine the number of students who specialized in botany with Professor Winchell. It must be remembered that only a few continued for the master's degree at that time. Three students of this period became prominent in the botanical field. The first of these was William J. Beal ('59, A.M. '62, Ph.D. hon. '80), who was for many years Professor of Botany at Michigan Agricultural College (Michigan State College) and one of the leading botanists of the country. The other two were Mark W. Harrington ('68, A.M. '71, LL.D. '94) and Volney M. Spalding ('73, Ph.D. Leipzig '94), both prominent later in the development of the botanical department at Michigan. That Winchell also interested other students in botany is shown by the contribution of valuable collections of plants by a number of alumni, notably Josiah T. Scovell, who was a student here between 1867 and 1869, Albert E. Foote ('67m), and Joseph C. Jones ('72, A.M. '75).

Eugene W. Hilgard (Ph.D. Heidelberg '53) succeeded Winchell as Professor of Geology, Zoology, and Botany. He had been Professor of Chemistry at the University of Mississippi and the state geologist. In 1874 his title was changed to Professor of Mineralogy, Geology, Zoology, and Botany. Mark Harrington apparently taught botany.

Harrington, while a senior student (1868), had assisted Winchell in the Museum without compensation. Upon graduation he was appointed Assistant Curator in the Museum. It was his duty to collect and identify specimens, catalogue collections, and prepare material for exchange. In 1870 he was appointed Instructor in Mathematics in addition to his position in the Museum. In 1871, he was given leave of absence to serve as astronomical aide for the United States Coast Survey in Alaska. He did not overlook his botanical opportunities, but made a collection of plants which was sent to the Smithsonian Institution. A set of these was received later by the University. During his absence in 1872, he was appointed Instructor in Geology, Zoology, and Botany. He returned to Ann Arbor in December, 1872, about three months before Winchell's resignation. In 1873 he became Assistant Professor of Geology, Zoology, and Botany and in 1874, by Professor Hilgard's request, was placed in charge of the work in zoology and botany. Hilgard resigned in February, 1875, to become Professor of Agricultural Chemistry at the University of California. Harrington continued to give the courses in zoology and botany. In 1876 he was granted leave of absence to study in Europe. While abroad, he resigned (1877) to become a professor of astronomy and mathematics in China. This terminated his official connection with the teaching of botany at the University. When Harrington returned, in 1879, he was appointed Pro-

fessor of Astronomy and Director of the Observatory.

Although Harrington was in charge of botany for only a few years, he contributed much to the development of the subject. The establishment of the School of Pharmacy brought increased demands, and he developed a course in pharmaceutical botany in which emphasis was placed upon the identification of drugs of vegetable origin and the detection of adulterants. In 1874 he offered for the first time a course dealing exclusively with cryptogamic plants.

The botanical collections were considerably increased through Harrington's efforts; in his report to the president in 1875, however, he complained that the great increase in his teaching load had prevented him from properly caring for them. Among the accessions were the plants collected by J. B. Steere on his trip to South America, the East Indies, and the Philippines. Harrington studied the ferns, finishing his investigation at Kew in England. His paper giving the results of this study, "Tropical Ferns Collected by Professor Steere in the years 1870-75," apparently was the first botanical research paper to be published by a member of the faculty.

THE PERIOD FROM 1877 TO 1904.—In 1876, Volney M. Spalding was appointed Instructor in Zoology and Botany, to assume Harrington's duties while he was on leave in Europe. After Harrington's resignation in 1877, Joseph B. Steere ('68, '70, Ph.D. hon. '75), who had been Assistant Professor of Paleontology, became Assistant Professor of Zoology and Paleontology. Spalding continued as Instructor in Zoology and Botany. Whether he continued to teach courses in zoology is not certain. His title was changed to Instructor in Biology and Botany in 1878, and it is probable that Steere gave the courses in zoology and paleontology and that Spalding taught the course in biol-

ogy and the courses in botany. At any rate, the work in botany was definitely separated from that in zoology in 1879, when Steere became Professor of Zoology and Curator of the Museum, and Spalding was made Assistant Professor of Botany. Spalding became Professor of Botany in 1886.

Instruction in botany for a time followed the pattern established by Harrington. In 1877, Louisa Maria Reed ('76, M.S. '77) was appointed as an assistant in microscopical botany. In 1878 she married Charles H. Stowell, Instructor in the Physiological Laboratory, later Professor of Histology and Microscopy. Until her resignation in 1889 the courses in botany were given by Volney M. Spalding and Mrs. Stowell. For a year or two she assisted Professor Spalding. She then taught the courses in structural botany, histology, pharmaceutical botany, and microscopy. Her title did not do justice to her responsibilities and attainments. She taught half of the courses in botany, and her scientific accomplishments were recognized by election as fellow of the Royal Microscopical Society of London—the first woman to be so honored. She certainly deserves recognition as the first woman instructor of the University.

Professor Spalding gave a general course in botany entitled *Elements of Biology (Plant Life)*, which was described as "a study of typical species of plants with reference to structure, physiology and development." It has been continued to the present (for some years with a similar course in zoology as *General Biology 1 and 2*).

During the first part of this period, Spalding also devoted considerable attention to the study of cryptogamic botany with special emphasis upon fungi. This naturally led into the subject of fungi as plant parasites. Plant pathology was then in its infancy. Several students of this period, notably Erwin F. Smith

('86, Sc.D. '89) and Lewis R. Jones ('89, Ph.D. '04), became leaders in this field.

In 1881 Spalding taught a new course, Forestry, offered in the Department of Botany and also in the School of Political Science. This apparently was the first formal instruction in forestry to be given in the United States (Dana, p. 253). The course was discontinued at the end of four years. Spalding, however, maintained a very active interest in the subject and had an important part in establishing the Department of Forestry in 1903. As has been pointed out by Dean Dana, it is a striking evidence of the breadth and vision of Professor Spalding that he should have foreseen the necessity of meeting future problems in forestry at a time when forestry resources were regarded as "inexhaustible."

In 1901, Charles Albert Davis (Bowdoin '86, Ph.D. Michigan '05) was appointed Instructor in Forestry. He had been Professor of Natural Science at Alma College. He registered for graduate study in botany at the University and received the doctorate in 1905. Davis was much interested in the forestry of the state and published a number of articles. He was Curator of the Herbarium from 1905 to 1908 and then became the peat expert of the United States Bureau of Mines.

After the resignation of Mrs. Stowell, Frederick Charles Newcombe ('90, Ph.D. Leipzig '93) became Instructor in Botany (1890). He was made Acting Assistant Professor and had charge of the department during Spalding's absence at Leipzig, where he, like Newcombe, received the doctorate under Pfeffer, in 1894. Newcombe became Assistant Professor in 1895 and was appointed Professor of Botany in 1905. He was principally interested in plant physiology, and consequently this subject received greater emphasis, resulting in the offering of three courses and opportunities for investigation by advanced students.

Pharmaceutical botany was continued by Julius O. Schlotterbeck, who was appointed Instructor in Pharmacognosy and Botany in 1893 and continued to teach the course until his death in 1917, when he was Dean of the School of Pharmacy and Professor of Pharmacognosy and Botany.

During the latter part of this period Professor Spalding's interests turned more to the field of plant ecology, resulting in the offering of several courses in this subject. In 1899, he initiated a course entitled Teachers' Conference and Field Club, planned to give training in collecting and preparation of material and in the development of courses in high-school botany. This is still continued as the teachers' course in botany.

Apparently Professor Newcombe started the botanical journal club in 1894. Under Botany 11, Current Literature of Botany, in the 1895-96 *Calendar* it is stated that this course "constitutes a journal club, meeting once a week, in which important current papers on botany are reviewed and discussed by instructors and advanced students. All students are admitted to the meetings, but only advanced students may elect the course." This was the first course of the kind on the campus. It has continued to be an important factor in the training of advanced students in the Department of Botany.

The increase in the number of students and the multiplication of courses necessitated additions to the botanical staff. Among the six instructors who served for some time in the period 1892-1906 were the following: James Barkley Pollock (Wisconsin '93, Sc.D. Michigan '97), 1897-1932; Julia W. Snow (Cornell '88, Ph.D. Zurich '93), 1898-1900; and George P. Burns (Ohio Wesleyan '98, Ph.D. Munich '00), 1902-12.

Before 1891, the Department of Botany occupied two rooms of about one

thousand square feet each in Mason Hall (Newcombe, p. 478). The one on the fourth floor was used as a laboratory, and the other, on the second, contained the collection of plants. The needs of the department so increased that these quarters were very inadequate, and in 1891 the department moved to the South Wing of University Hall, where it occupied all four rooms of the fourth floor. In addition, the ends of the corridors were partitioned off for offices and storerooms. Later, three additional rooms on the ground floor were added. The facilities for studying living plants were limited, since plants could be grown only in the windows. This situation was remedied in 1903 to some extent, by the renting of a small space in Cousins and Hall's greenhouse on South University Avenue.

A number of the students of this period became prominent in botany or closely allied subjects—twenty-six were listed by Newcombe in 1903 (*Mich. Alum.*, 9: 445). Among the students who obtained the early part of their botanical training at the University of Michigan were George B. Sudworth ('85), Dendrologist, United States Department of Agriculture; Filibert Roth ('90), Professor of Forestry, University of Michigan; Burton E. Livingston ('98, Ph.D. Chicago '01), Professor of Plant Physiology, Johns Hopkins University; Howard S. Reed ('03, Ph.D. Missouri '07), Professor of Plant Physiology, University of California Citrus Experiment Station. According to available records, twenty students specializing in botany took master's degrees during this period. Among these were Charles O. Townsend ('88, Ph.D. Leipzig '97), Pathologist, United States Department of Agriculture; and John H. Schaffner (Baker '93, M.S. Michigan '94), Professor of Botany, Ohio State University.

The doctoral dissertation of Abram Sager Hall ('76, Ph.D. '78) was con-

cerned with a study of a group of the Ascomycetes. This was the first doctorate in botany and the third degree of doctor of philosophy to be granted by examination from the University, the two previous ones having been given in 1876. Abram Sager Hall retired from the position of Professor of Natural Science, Washington College, Maryland, in 1927 and now lives at Saline, Michigan. Seven other students received doctorates in botany during this period. These and their later positions are as follows: Douglas Houghton Campbell (Ph.M. '82, Ph.D. '86), Professor of Botany, Leland Stanford Junior University; Erwin F. Smith, Pathologist, United States Department of Agriculture; James B. Pollock, Professor of Botany, University of Michigan; Joseph W. T. Duvel (Ohio State '97, Sc.D. Michigan '02), Crop Technologist, United States Department of Agriculture; Raymond H. Pond (Kansas Agricultural College '98, Ph.D. Michigan '02), Professor of Plant Physiology and Pathology, Texas Agricultural and Mechanical College; Lewis R. Jones ('89, Ph.D. '04), Professor of Plant Pathology, University of Wisconsin; and Edgar N. Transeau (Franklin and Marshall '97, Ph.D. Michigan '04), Professor of Botany, Ohio State University. Two factors aided in the development of graduate instruction: graduate students were employed to assist in the teaching, these numbering three in 1904-5; and in 1898, Dexter M. Ferry gave \$500 for a botanical fellowship.

There was a marked increase in the amount of botanical research and publication during this period. During the earlier years Mrs. Stowell published a number of papers concerning plant morphology, with emphasis upon microscopical structures. She was coauthor, with her husband, Charles H. Stowell, of a book entitled *Microscopical Diagnosis* (1882). She was also one of the editors of

the journal, *The Microscope*. The master's thesis of Douglas Houghton Campbell in 1882 was on the microscopical structure of vegetable textile fibers.

As already mentioned, Volney M. Spalding published a number of papers concerning various aspects of forestry. He made a study of forestry conditions in the northern part of the Lower Peninsula and made recommendations in regard to a forestry program. In 1899 his study of white pine was published by the United States Department of Agriculture.

The cryptogams received considerable attention. L. N. Johnson, during the few years he was an instructor, made an excellent start on a study of the cryptogamic flora of Michigan. He published several papers on desmids. He added many collections of fungi to the herbarium and sent specimens to Ellis and Peck, who described a number of species from them. His early death in 1897 brought to an end a very promising botanical career. A number of the graduate students studied problems in plant pathology. Erwin F. Smith, whose dissertation for the doctor of philosophy degree was "Experiments with Fertilizers for the Prevention and Cure of Peach Yellows," became a plant pathologist of world renown. His studies of the bacterial diseases of plants are classic. Lewis R. Jones, whose dissertation for the doctor of philosophy degree was "Cytolytic Enzyme Produced by *Bacillus carotovorus* and Certain Other Soft-rot Bacteria," became not only a leading investigator but also an outstanding teacher in the field of plant pathology. Many of the plant pathologists of today were his students.

Miss Julia Snow, during the few years when she was an instructor, took part in a biological survey of Lake Erie, which was under the direction of Professor Reighard of the Department of Zoology. She studied and reported on the plankton algae and published several other

papers concerning algae. Adrian J. Pieters ('94, Ph.D. '15) studied the flowering plants. There was a very active interest during the latter part of this period in aquatic biology.

Douglas Houghton Campbell's doctoral dissertation in 1889 was entitled, "Development of the Ostrich Fern (*Onoclea Struthiopteris*).". Professor Campbell is noted for his studies in the comparative morphology of plants.

As a result of the specialization of Frederick C. Newcombe and Volney M. Spalding under Pfeffer at Leipzig, investigation in plant physiology was stimulated at the University of Michigan. Professor Newcombe published twenty-three papers during this period based on his physiological studies, mostly concerning the sensitive reactions of plants. The doctoral dissertation of J. B. Pollock in 1895 was entitled, "Mechanism of Root Curvature."

During the last part of his career at the University Professor Spalding published a number of papers concerning plant ecology. After his resignation in 1904 he continued ecological studies at the Desert Laboratory of the Carnegie Institution in Arizona, until ill health forced him to retire to a sanatorium, where he died in 1918. George P. Burns also published a number of papers on this aspect of botany.

In 1892 Volney M. Spalding, William H. Howell, Jacob E. Reighard, and Joseph B. Steere circularized the biologists of the state concerning the desirability of a state society of naturalists. In June, 1894, Newcombe headed a committee that called a meeting in Ann Arbor in the Department of Botany, and at this meeting W. J. Beal of Michigan Agricultural College was elected president and F. C. Newcombe, secretary. The Michigan Academy of Science was organized and its first meeting was held at Lansing in December, 1894. Bryant Walker was

elected president; Newcombe was elected vice-president for the section on botany.

THE PERIOD FROM 1905 TO 1923.—In May, 1905, a little less than a year after Spalding's resignation, Newcombe was promoted to a full professorship of botany and was appointed Director of the Botanical Laboratory. He directed the activities of the Department of Botany until his retirement in 1923. The staff grew from five faculty members and three assistants in 1904-5 to ten faculty members and six assistants in 1922-23. James B. Pollock, who had come to the University as Instructor in 1897, attained an associate professorship in 1914. George P. Burns, who was Instructor, became Assistant Professor in 1906 and Junior Professor in 1910. He resigned in 1912 to become Professor of Botany at the University of Vermont. Calvin H. Kauffman (Harvard '96, Ph.D. Michigan '07), previously Instructor in Botany, was successively promoted and was appointed to a full professorship in 1923. As already mentioned, Julius O. Schlotterbeck ('91, '87p, Ph.D. Bern '96) continued to give instruction in pharmacognosy and in botany.

In 1908 Henri T. A. de L. Hus (California '97, Ph.D. Washington Univ. [St. Louis] '08) was appointed Instructor in Botany. He became Assistant Professor in 1912, and his services terminated in 1917. Henry A. Gleason (Illinois '01, Ph.D. Columbia '06) was appointed Assistant Professor in 1910. He was promoted to Associate Professor in 1916 and resigned in 1919 to go to the New York Botanical Garden. In 1913 Walter W. Tupper (Harvard '10, Sc.D. *ibid.* '18) was appointed Instructor in Botany. He became Assistant Professor in 1920. John H. Ehlers ('99, Ph.D. '14) became an Instructor in 1915 and Assistant Professor in 1920.

In 1915, Harley H. Bartlett (Harvard '08) was appointed Acting Assistant Pro-

essor during the absence of Dr. Hus on leave. He became Assistant Professor in 1916 and was appointed to a full professorship in 1921. Bradley M. Davis (Stanford '92, Harvard '93, Ph.D. *ibid.* '95) was appointed Professor in 1919; thus, for the first time, there were two full professorships in the Department of Botany. Carl D. La Rue ('14, Ph.D. '21) and Felix G. Gustafson (Wisconsin '15, Ph.D. Harvard '21) became instructors in botany in 1920.

In 1905 the Department of Botany still occupied the fourth floor and a part of the first floor in the South Wing. These quarters had long been inadequate. In 1913 a fire occurred that destroyed part of the fourth floor and caused damage to the remainder. Insurance made it possible to replace most of the losses except the collections destroyed in the herbarium. A number of years' agitation for better facilities finally resulted in an appropriation for the Natural Science Building, which was occupied in 1915. The Department of Botany was assigned its present quarters on four floors in the southeastern section. It was provided several laboratories for simultaneous sections of elementary botany, and special laboratories for anatomy, cytology, cryptogamic botany, and physiology, the last with a greenhouse attached. The phanerogamic herbarium occupied a double room on the third floor, and the cryptogamic herbarium similar quarters on the fourth. Each staff member had an office and a laboratory for his researches, and each graduate student had a room to himself.

In 1906 the Botanical Gardens and Arboretum were established through the gift of a large tract of land lying between Geddes Avenue and the Huron (see Part III: BOTANICAL GARDENS). George P. Burns was appointed Director. Previously a small garden had been maintained in the southeastern corner of

the campus for class use and other purposes (*News-Letter*, 8: 57). Henry A. Gleason became Director in 1915, and Harley H. Bartlett in 1919.

During this period there was increased interest in the development of the herbarium. In 1912 C. H. Kauffman was made Curator of the Cryptogamic Herbarium and H. A. Gleason Curator of the Phanerogamic Herbarium. J. H. Ehlers became Curator of the latter in 1916. In 1921, C. H. Kauffman was placed in charge of the herbarium as director.

For the most part, the fields of instruction developed during the previous period were maintained and expanded. Additional courses were developed: Forest Pathology, Forest Botany, Agrostology, Microbiology, Genetics, Cytology, and Paleobotany. The increase in the staff also resulted in a corresponding increase in the number of courses offering advanced instruction and investigation in specialized fields. A series of five numbers entitled "Field Studies in Botany" was published in 1906 as a guide for teachers.

Financial support for advanced students was increased through the gift of funds for fellowships. The Dexter M. Ferry fellowship was continued until 1909. In 1903, Joseph B. Whittier of Saginaw gave \$4,000, the income to be used for the Angeline Bradford Whittier fellowship, in honor of his mother. In 1910 the University received a bequest from Emma J. Cole, of Grand Rapids, which finally amounted to \$21,000. It was specified that the income should be used for graduate fellowships in botany. Miss Cole was an enthusiastic student of the botany of the Grand Rapids area and a teacher in the Grand Rapids High School, and she had a deep interest in the welfare of students. Funds were also received from the United States Rubber Company to support the work of three students in genetical and biochemical studies of

rubber-producing plants. Sixty-six students specializing in botany obtained master's degrees, and thirty-one received degrees of doctor of science or doctor of philosophy.

This was a period of productive research by members of the staff and by advanced students. Newcombe continued his studies of sensitive reactions of plants. During the early part of this period a majority of the graduate students conducted researches in various phases of physiology. Kauffman's doctoral study concerning physiological factors influencing reproduction in *Saprolegnia* initiated a series of investigations concerning reproduction of fungi by graduate students under his direction. Kauffman published a series of papers concerning the cryptogamic flora of Michigan and started his studies of the fungi of the western United States. His monograph of the Agaricaceae of Michigan is a major contribution to the knowledge of the fungi of eastern North America. Burns and Gleason published a series of ecological studies specially concerning the Ann Arbor and Douglas Lake areas. There was a decided increase in studies in the field of genetics by Bartlett and his students. Gleason engaged in a monographic study of the Vernoniaeae. The demands of the automobile industry for increased rubber resulted in investigations for the United States Rubber Company by Bartlett and La Rue concerning the culture of the rubber plant in the East Indies.

THE PERIOD FROM 1923-1940.—Following the retirement of Newcombe in 1923, Harley Harris Bartlett became Chairman of the Department of Botany. The staff also included Professors Davis and Kauffman, Associate Professor Pollock, Assistant Professors Tupper and Ehlers, and four instructors. Kauffman was retired on account of ill health in 1930, and he died in 1931. Pollock was promoted to a full professorship in 1925.

He reached the retirement age in 1932, and his death was in 1934. Tupper resigned in 1936 on account of ill health and died in 1939. Ehlers became Associate Professor in 1933 and reached the retirement age in 1939. Carl D. La Rue and Felix G. Gustafson became associate professors in 1934.

Lewis E. Wehmeyer ('21f, Ph.D. '25) was appointed Instructor in Botany in 1928. He became Associate Professor in 1937. Chester A. Arnold (Cornell '24, Ph.D. *ibid.* '29), appointed Instructor in Botany in 1928, was promoted to an assistant professorship in 1935. He has also held the position of Curator of Fossil Plants in the Museum of Paleontology since 1931. In 1930, Edwin B. Mains ('13, Ph.D. '16) was added to the staff as Professor of Botany. He was also appointed Director of the University Herbarium. William Randolph Taylor (Pennsylvania '16, Ph.D. *ibid.* '20) was appointed Professor of Botany in 1930 and Curator of Algae in the University Herbarium. Kenneth L. Jones (Syracuse '28, Ph.D. Michigan '33) became Instructor in 1930 and Assistant Professor in 1937. William C. Steere ('29, Ph.D. '32) became Instructor in 1931 and Assistant Professor in 1936. Also in 1936 Frederick K. Sparrow ('25, Ph.D. '29) came to the department as Assistant Professor and Elzada U. Clover (Nebraska State Teachers College '30, Ph.D. Michigan '35) was appointed Instructor in Botany and Assistant Curator in the Botanical Gardens.

Work in the fields of instruction which had been developed during the previous periods was continued and expanded. The rapid growth of the department has made the present quarters in the Natural Science Building again inadequate. In 1928, when the new Museums Building was completed, the Herbarium was moved to the fourth floor of the research wing.

In 1928, the University received a be-

quest of more than \$50,500 from the estate of Frederick C. Newcombe, the income to be used for fellowships in plant physiology to be known as the F. C. and Susan Eastman Newcombe fellowships. This fund has provided financial aid for fifteen advanced students throughout their graduate study. Four students were supported by the Ferry fellowship, and to date seventeen have had financial aid from the Whittier and thirty from the Cole fellowships. During this period 159 students specializing in botany received master's degrees, and fifty-nine the degree of doctor of science or of doctor of philosophy. As far as it has been possible to determine, 245 master's degrees, in all, have been given in botany, and ninety-eight doctor's degrees.

The researches of members of the staff and of advanced students have shown a steady increase. With the development of better transportation facilities, botanical exploration has been greatly broadened geographically. Bartlett has continued his studies in Eastern Asia and in 1935 was Exchange Professor at the University of the Philippines. Pollock was exchange professor at the University of Hawaii from 1922 to 1924. In 1927 Carl D. La Rue took part in the Ford expedition to the Amazon. Bartlett, Steere, and Mains, with members of the staffs of the Museums, have taken part in a biological survey of the Mayan area of Central America in co-operation with the Carnegie Institution of Washington. W. C. Steere was exchange professor at the University of Puerto Rico in 1939-40 and made an intensive study of the bryophyte flora while there. Bartlett and several graduate students have spent several seasons in northern Mexico. Taylor has taken part in several Hancock marine expeditions to the Galapagos Islands, to the Pacific coasts of Colombia, Panama, Costa Rica, and Mexico, and to the southern Caribbean Sea.

Emphasis on investigations of the botany of Michigan has been continued. Studies have also been made throughout the United States, specially in the West, by Professors Kauffman, Wehmeyer, Baxter, Dr. Clover, and graduate students. Wehmeyer has given considerable attention to the fungi of Nova Scotia, and Baxter has spent a number of summers in exploration in Alaska.

The taxonomy of flowering plants has occupied the attention of a number of the staff and students, Bartlett specializing upon the Palmae and Clover on the Cactaceae. Arnold has published a series of papers on fossil plants.

Cryptogamic botany has continued to be a major field of interest. Kauffman monographed a number of genera of the Agaricaceae, and Wehmeyer the genus *Diaporthe*. Baxter has specialized on *Poria*, Mains on the Uredinales and *Cordyceps*, and Sparrow on the Chytridiales. Jones has been engaged in investigations in the genus *Actinomyces*. Steere has published a series of papers on the bryophytes of North America, including several genera for Grout's *Moss Flora*. Pollock made a study of the coralline algae and coral reefs of the Hawaiian Islands. Taylor has written a number of papers on the marine algae of North and South America and has prepared a manual of the group for the northeastern coast of North America. Investigations in plant pathology have been conducted by Mains on physiologic specialization in fungi and the inheritance of disease resistance and by Baxter on the action of wood-rotting fungi.

Davis and Bartlett have studied the genetics of *Oenothera*, and Davis has investigated the cytological mechanism. In plant physiology, Gustafson has carried out a series of studies concerning the factors influencing the development of fruits, and La Rue has investigated the regeneration of plant tissues. In 1923, a

botanical seminar was initiated under the direction of Professor Davis for the purpose of reviewing the researches of

members of the staff and graduate students.

EDWIN B. MAINS

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THE BOTANICAL GARDENS

THE law of August 26, 1817, which actually created the University, provided that the governing board should have power to establish various "useful literary and scientific institutions," among which "botanic gardens" were named. During the twenty years of its existence in Detroit it cannot be supposed that the nascent University could do more than hold such an idea in memory.

The birthday of the University in Ann Arbor was June 5, 1837, when the Board of Regents held its first meeting there. The first professor to be appointed was the brilliant young botanist Asa Gray, who was soon to become the leader of botany in America, and to maintain his leadership for half a century.

His chief service to the University during the short period that he held the professorship of botany *in absentia* was to visit Europe to purchase books for the Library, and it is almost certain that it was he who designated the eastern half of the original forty-acre campus as the "Botanic Garden." He visited Ann Arbor in August, 1838, and made the original plan for the development of the campus. The early map which is referred to by local historians as long in the custody of the University Museum has disappeared, but the proposed botanical garden was mentioned in the *Proceedings of the Board of Regents* for December 20, 1841, only three years after Gray's visit to Ann Arbor, and a printed map dated 1854 actually shows the "Botanic Garden," but whether it was then *in re* or *in spe* nobody now knows.

If the Gardens were ever begun the evidence had disappeared by 1868, when Alexander Winchell pleaded with the Regents to get the Gardens under way

(*R.P.*, 1864-70, p. 301). Assistant Professor Mark Harrington did likewise in his report for 1873-74, and enough interest was aroused so that "a wealthy friend of the University" was at the point of establishing a botanical garden and conservatory by gift of "the fine brick residence and grounds of the well-known Smith property on Washtenaw Avenue across from the campus." This project was not carried out, and it remained for Professor Volney M. Spalding and Dr. Julius O. Schlotterbeck to start the Gardens on the campus itself. The first planting was done in 1897, with plants and seeds donated by the Michigan Agricultural College, through Professors C. F. Wheeler and W. J. Beal, and by the United States Department of Agriculture, through Mr. George H. Hicks.

Since 1897, although there have been two changes of location, the Botanical Gardens have had a continuous existence. Maintained in the early years on the campus as an adjunct of the Department of Botany and of the School of Pharmacy, the Gardens had no designated administrative official, depended largely upon voluntary labor of faculty and students, and led a precarious but scientifically productive life. It is recorded that the Regents "supplied an expert gardener and sufficient funds to increase materially the number of plants." The gardener seems to have been temporarily assigned by the superintendent of grounds. There was no greenhouse, but the Department of Botany rented space in the commercial greenhouses of Cousins and Hall on South University Avenue and was thus enabled to accumulate by gift and purchase a few interesting tropical or tender

species which were to become the nucleus of the future greenhouse collections.

During the later years of the campus Gardens, additional land was rented elsewhere, because much material of single species was necessary for the phytochemical studies conducted by Professor Schlotterbeck and his pharmacy students. Inspection of William J. Hale's bibliography of the Chemical Laboratory for the years 1897 to 1906 will indicate the extent to which the Botanical Gardens contributed to research in that decade.

Maintenance of the Gardens on the crowded campus was so difficult that in 1899 energetic efforts to obtain a new site were begun, mainly through the initiative of Professors Volney M. Spalding and Frederick C. Newcombe, whose project was supported by Professor Jacob E. Reighard. Success was in sight in 1902, when it seemed that the properties included in Felch Park and the adjoining "cat-hole," on which are now located the various University buildings extending from the present Kellogg Foundation to the Storehouse, could be had for the Gardens. Just why the plan failed is obscure.

In 1906, however, on Newcombe's recommendation, Dr. and Mrs. Walter H. Nichols offered a tract of about twenty-seven acres between Geddes Avenue and the Huron River for the Botanical Gardens. The staff of the Department of Botany then included George P. Burns, the pioneer enthusiast in city planning through whose efforts Ann Arbor first became conscious of its need for a park system. He convinced the city authorities that they should permit the use of a tract of about twenty-five acres adjoining the Nichols property. Burns likewise secured a gift of thirty acres from the Detroit Edison Company. Thus, a tract of about eighty acres became available for the Botanical Gardens. This sec-

ond site passed under the direct supervision of the Department of Landscape Design in July, 1916, although nominally it was controlled by the Botanical Gardens until the year 1919. In 1923 it became the present Nichols Arboretum. We are concerned here only with the period from 1906 to 1916, during which it was actually supervised by a director chosen from the Department of Botany and was known as the "Botanical Gardens and Arboretum."

The development of the Huron River tract was planned by Mr. O. C. Simonds of Chicago, a member of the class of 1878. He carried out his work to the great satisfaction of everyone concerned. President Angell said, in his report of September, 1908:

The establishment of a botanical garden makes possible an extension of the work in other departments both in the line of teaching and that of research. Demonstration material will be grown for the use of the students in botany, forestry, and pharmacy. Opportunity is offered for investigation of many problems in plant physiology, plant breeding, plant disease, and ecology which could not hitherto have been attempted.

The first Director of the Botanical Gardens and Arboretum was George P. Burns, who served under definite appointment from February, 1907, until February, 1910. He went to the headship of the Department of Botany at the University of Vermont and was succeeded by Charles Herbert Otis, who served as Curator from 1910 to 1912 and as Acting Director in 1912-13. Otis left to accept a position at Cornell University and was followed by Adrian J. Pieters, of whose official appointment there seems to be no record, but who served as Acting Director from 1913 to 1915, when he left the University for the United States Department of Agriculture.

Henry Allan Gleason, the second regularly appointed Director, served from

1915 to 1919. Before his appointment took place there had been more or less open dissatisfaction with the site of the Gardens, largely because of the very uneven topography of the tract. It had very little flat land, suitable for experimental work, but a predominance of bluffs broken by ravines, admirable for permanent collections of woody species and for demonstrations of landscape planting. It was felt, on the one hand, that the botanists were not giving proper attention to the sort of development that the tract was best suited for, and were therefore not serving the needs of the Departments of Landscape Design and of Forestry. On the other hand, the botanists were not finding the site adapted to systematic gardens or experimental cultures.

The dissatisfaction reached a climax in April, 1913, when the administration of the Gardens was vested in a board consisting of the president of the University, the dean of the School of Pharmacy, the heads of the Departments of Botany, Forestry, and Landscape Design, Assistant Professor Henri T. A. de L. Hus, of the Department of Botany, the superintendent of grounds, and the secretary of the University. Some were appointed by name rather than by position, but the intention was to have all membership except that of Hus *ex officio*. He had been the one person productive in published experimental research conducted at the Huron River site, and his special interest was recognized by giving him membership in the committee, which, until a year later, did not even include Pieters, who was in fact directing the Gardens.

This "committee of management of the Botanical Gardens" was to have custody over the Huron River site (the present Nichols Arboretum) and also of a new site where the botanists would have plenty of flat land for extensive green-

houses, formal plantings, and experiment plots.

Pieters did much scouting for the proposed new supplementary site, and in January, 1914, the Regents appointed a committee consisting of Regent Junius E. Beal and Secretary Shirley W. Smith to purchase whatever land seemed needed. As a result the University came into possession of the first twenty acres of the present Botanical Gardens, situated near Packard Road beyond the city limits in the direction of Ypsilanti.

Only the Department of Botany had been actively concerned in the development of the Huron River site from 1906 to 1914, but harking back to the time when the College of Pharmacy had made the chief use of the campus garden, and in recognition of the Department of Forestry's unfavorable report on the Department of Botany's stewardship of the Nichols site, it was decided by President Hutchins to give each presumably interested department a voice in the control of the reorganized Gardens and Arboretum. It was to have two branches, with the Department of Botany and the College of Pharmacy predominantly interested in one and the Departments of Landscape Design and of Forestry in the other. The director of the Gardens was to be a member of the staff of the Department of Botany, as required by the deeds of gift of the Huron River site, but he was to delegate actual control of the latter to the head of the Department of Landscape Design. It was in accordance with this scheme, formulated in 1914, that Professor Aubrey Tealdi took charge in 1916 of what was later to become, after modification of the deeds of gift, the Nichols Arboretum. Gleason went to the New York Botanical Garden in January, 1919, and the present Director, Harley H. Bartlett, was appointed his successor.

The interdepartmental committee did not function well, and after Bartlett had

held the directorship for a year, President Hutchins was content to change the organization by the simple expedient of calling no meetings of the committee. The change was later officially recognized by the Regents. The Botanical Gardens became an autonomous department of the College of Literature, Science, and the Arts and was ordered to operate in whatever manner would best serve the purely botanical interests of the University. It was understood that the Department of Botany, as such, was to have no control over the policies or budget of the Gardens, but that whenever the directorship of the Gardens became vacant, it should be filled by the appointment of an active member of the faculty of the Department of Botany. The plan so informally put into effect has operated smoothly.

The reason for the change was well known at the time. Because of the wartime demand for drugs, Professor Henry Kraemer of the College of Pharmacy had been co-operating with various commercial manufacturers of pharmaceuticals in the growing of drug plants. The crops were successfully produced and sold, and the enterprise bade fair to absorb a lion's share of the facilities of the Gardens with no commensurate gain to science. The commercial side of the project (not handled officially through the director of the Gardens) was rapidly outrunning the educational and scientific. With Professor Kraemer (in 1919 appointed Dean of the College of Pharmacy) dominating the committee, there seemed no painless way to control the situation. He wanted to grow drugs and still more drugs, but as a purely commercial and demonstrational enterprise. President Hutchins made a wry face and decreed that there should be no committee!

In 1924 the School of Forestry moved its nurseries from lots on State Street near Ferry Field, which had been out-

grown, to the Botanical Gardens. Here they have remained ever since. The expansion was made by the purchase of slightly more than two acres of additional land adjoining the Gardens at the southeast. At this time the western end of the Gardens and the adjoining property on the west and southwest were of little utility because they were frequently flooded by an open drain. In order to encourage land reclamation by the construction of a deep concrete conduit and also to provide for further expansion of the Gardens, three other parcels of land, aggregating nearly thirty acres, were purchased in 1924 and 1928. The Ford Motor Company gave an unused right of way along the western boundary (about half an acre) in 1925. The present area is 51.72 acres, and as a result of the improvement of the drainage it is all available for planting.

No effort has been spared which might make the Gardens of service to the University and the community as a whole. An annual chrysanthemum show has been held since 1912. This is the most important horticultural and popular activity of the Gardens.

The predominant activity of the Gardens, however, has, from the very first, been research, and there has been a steady increase in the volume of work carried on. In the fields of genetics and experimental taxonomy there has been long-continued research on the evening primroses (genus *Oenothera*), which became well known to experimentalists at the beginning of the century through the mutation theory of Professor Hugo de Vries of Amsterdam. His extraordinarily important studies attracted the attention of other workers to the same genus, among them Professor Bradley M. Davis and the present Director of the Gardens. Previous to 1919, Davis had carried on his *Oenothera* work at the Harvard Botanical Garden, at the Woods Hole

Marine Biological Laboratory, and at the University of Pennsylvania.

Bartlett's *Oenothera* experiments, begun at Washington in 1909 and continued after 1915 at Michigan, were the first research for which provision was made at the Packard Road site. This work for some years occupied not only much of his own time but also that of the Assistant Director. Other members of the present botanical staff have utilized the research facilities of the Gardens for themselves and their students. Especially indefatigable has been Professor Felix G. Gustafson, who has carried out such interesting work as the induction of seedless fruit formation (parthenocarpy) by the action of hormones. Professor Edwin B. Mains and his students have been actively engaged in the study of physiological races of the fungi which cause plant disease and have been breeding useful and ornamental plants for disease resistance at the Gardens since 1930.

Members of the Michigan faculty whose doctoral dissertations were based upon work done at the Gardens include William Campbell Steere, who worked on forms of *Petunia* and other Solanaceae with supernumerary chromosomes, and Kenneth L. Jones, who investigated the heredity of sex forms of ragweed.

Special collections have been built up for continuing research in several groups. The collection of wild roses was especially notable during the years in which the researches of Dr. Eileen Erlanson were in progress. The most extensive outdoor planting now is that of *Prunus* (plums and cherries). The best greenhouse collections are those of Cactaceae, studied by Dr. Elzada Clover, and various succulents of other groups, now being used for cytological investigations. The first large accession of greenhouse plants came from the Missouri Botanical Garden, through the friendly interest of Dr. William Trelease, the director.

The administration of the University once planned, by a gradual process of accretion, to transform the Botanical Gardens into a general biological institute. This idea was originally suggested by the fact that the genetical investigations of Ernest Gustav Anderson (National Research fellow from 1923 to 1926; Assistant Professor, 1926-27; and Lloyd fellow, 1927-28) were concerned with both maize and *Drosophila*—the fruit fly, chief laboratory organism for studies in genetics. It led to the authorization of investigations at the Gardens in the inheritance of melanism in snakes by Frank N. Blanchard, of the Department of Zoology, and his wife, the Assistant Director. This work has continued to the present time and has had many interesting by-products. The Gardens lacked the necessary facilities, however, for taking care of President Little's experimental mice when he moved to Ann Arbor from Maine, and so the animal work more naturally developed elsewhere (see Part VIII: LABORATORY OF VERTEBRATE BIOLOGY).

During recent years the investigations at the Botanical Gardens have taken an increasingly systematic and phytogeographic trend. The Director's participation in scientific expeditions to Mexico in 1930 and the Mayan region of Guatemala and British Honduras in 1931 resulted in the accumulation of living collections of plants which had not been adequately studied at the Gardens. Mexico, Guatemala, and the Southwest have subsequently yielded considerable numbers of unidentified succulents and other plants especially suitable for greenhouse culture. The first student expedition to Mexico representing the Gardens was that of Mr. and Mrs. C. L. Lundell, Mr. Alfred F. Whiting, and others in 1934. It was financed in part by the gradual accumulation of small gifts from the membership of the Botanical Gar-

dens Association, an organization authorized by the Regents in 1925. Subsequently, expeditions to Mexico and the Southwest have been made every year. From the standpoint of publicity the most notable of these has been the trip of Dr. Elzada U. Clover and Miss Mary Lois Jotter, to the canyon of the Colorado. They are to the present time the only women who have ever attempted and survived the trip by boat through the canyon. Lundell was still connected with the Gardens at the time of the Michigan-Carnegie expedition to Guatemala in 1933 and of his first Michigan excursion to Mexico (1934), after which he was transferred to the Herbarium and the Botanical Gardens' participation in the biological survey of the Mayan area ceased. More recently the Gardens have participated in Mexican exploration through collaboration with Dr. Forrest Shreve, of the Carnegie Institution of Washington, and Dr. Ivan M. Johnston, of the Arnold Arboretum of Harvard University, in a study of the Sonoran Desert.

Only four head gardeners have been so designated by official appointment. The first was Martin Bilon (1916-21), who had become greatly devoted to Bartlett's *Oenothera* research in the United States Department of Agricul-

ture; he came soon after the transfer of that work to Ann Arbor. He only returned to Washington at the latest date that permitted him to regain his civil service status. He was highly skilled in the handling of experimental cultures and in propagation. As gardener assigned to assist the famous rose-breeder, Dr. Walter van Fleet, he had saved, by means of grafting, fine horticultural rose varieties that had originated as interspecific hybrids whose embryos proved incapable of producing a primary root. He devised the method of grafting them, as minute objects in the cotyledonary stage, on unhybridized stock seedlings.

The second was Adriaan P. Wezel (1921-30), trained in Holland, an expert grower of chrysanthemums whose plants took prizes with unfailing regularity. He is known in Holland as a writer on American horticulture for Dutch periodicals. He left Michigan for a corresponding position at Smith College. From 1930 until 1935 Jacob J. Van Akkeren was the acting head gardener. He was succeeded by the present incumbent, Walter Kleinschmidt, who was trained at our Botanical Gardens and has reached his present position by conspicuous success in the complicated routine of growing plants for research and instruction.

HARLEY H. BARTLETT

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THE DEPARTMENT OF CHEMISTRY

I. DEVELOPMENT AND GROWTH OF THE CHEMICAL LABORATORY

EXPERIMENTAL sciences were given a place in the curriculums of University studies with the nomination of Douglass Houghton to a combined professorship of chemistry, geology, and mineralogy in 1839, but actual teaching of chemistry was deferred until 1844, when Silas H. Douglass¹ became an assistant to the Professor of Chemistry. At this time instruction in chemistry comprised lectures and quizzes only. Laboratory work was initiated shortly after Henry P. Tappan became President of the University in 1852. Mainly, it consisted of chemical analyses and their applications to toxicology and to other subjects, chiefly medical. Hence it was fitting that quarters for the work should be in the old Medical Building, known at that time as the "Laboratory Building." The plans for this structure had been drawn by Silas Douglass, who also superintended its erection. The immediate success of the practical course and of Douglass' persistent effort to pro-

cure a separate building for chemistry led to the inclusion of a request for a chemical laboratory building in the *President's Report* to the Regents in December, 1855.

The following spring, funds were appropriated for the erection of "a convenient building for the experiments and instruction in analytical chemistry," and Douglass was again made superintendent of construction. Thus was erected in 1856 the first chemical laboratory building of a state university, at a total cost of about six thousand dollars for building and equipment. It was a one-story structure containing three rooms and was equipped with twenty-six laboratory tables. Probably the original chemistry building, then called the Chemical Laboratory of the University of Michigan, was the first structure on the North American continent that was designed, erected, and equipped solely for instruction in chemistry. Other older American chemical laboratories, such as the quarters used by Professor Benjamin Silliman at Yale University, the laboratory of Dr. Robert Hare in Philadelphia, and the laboratories for instruction of students in chemistry and in physics at Rensselaer Polytechnic Institute, were not designed and erected for the pur-

¹ The family name was spelled Douglass until 1873, when "Douglass" was adopted to conform with usage in Scotland.

pose, but were adapted from structures already existing.

With the erection of this building the University inaugurated a policy of housing under one roof all chemical activities; academic as well as professional students had practical chemistry in the one laboratory. The natural growth of the University, and particularly the development of professional training in dentistry, engineering, medicine, and pharmacy, together with enhanced interest in chemistry for teacher training and as a profession distinct from engineering, have necessitated additions to the original structure from time to time. Altogether, seven additions were made—in 1861, 1866, 1868, 1874, 1880, 1888, and 1901. The third addition was coincident with the establishment of curriculums in pharmacy; the fourth barely preceded the establishment of the School of Pharmacy in 1876.

The number of laboratory tables had increased from the original twenty-six to 190 in 1874, and to 362 in 1901, exclusive of a limited number for special research and for staff use. It had not been possible to adhere to a definite structural plan in adding units to the building; hence, as a whole, the laboratory was unhandy. Moreover, it was not fireproof. Numerous locker fires in the course of years resulted ultimately in a ruling by the Regents prohibiting instruction in blowpipe analysis, this apparently having been mainly responsible for the difficulty. So far as can be ascertained at present, the prohibition is still in effect, although the work of the laboratory has been conducted in a fireproof building since 1909. Lack of adequate ventilation in the old building was apparent, especially in late afternoon hours, when dense and acrid fumes dimmed the analytical laboratories, and, incidentally, permitted only a short span of life to the woodwork of fume-closets. Still another seri-

ous deficiency was the almost complete lack of sanitary facilities.

The writer vividly recalls his first experiences in the University as lecturer on general chemistry to engineering students in 1902. Although included in engineering curriculums, the work was conducted in the Chemical Laboratory, which could not provide laboratory facilities for these students. The largest lecture room accommodated about 120 listeners, and the class numbered 279. To give all of its members the advantages of experimental lecture demonstrations, it was necessary to offer the single weekly lecture three times. This could be done only when the lecture room was not otherwise in use and when the students did not have other classes. In the several quiz sections that met twice weekly, some members would not have witnessed the demonstrations of the week, some would have seen them before either quiz, and others would have seen them only between quizzes. The arrangement certainly was disconcerting to the instructor, and it was not conducive to efficiency of teaching. Fortunately, amphitheater space became available in the old Medical Building when the new one was completed in 1903, and later the amphitheater in the old Dental Building was taken over for lectures to the larger classes in elementary chemistry. But these rooms had been built for other purposes and were unprovided with facilities adequate for setting up lecture demonstrations in chemistry.

Continued growth in numbers of students and an urge for expansion along various lines of chemical engineering, chemistry, and pharmacy showed that it was imperative to erect a new chemical laboratory building if the University were to maintain its leading position among institutions of higher learning. Prior to his death in 1905 Professor Albert B. Prescott had worked on tenta-

tive plans for a new building. His successor as Director of the Chemical Laboratory, Professor Edward D. Campbell, and a selected group of the staff also were busy with preliminary problems of spacing and equipment for the three units that would occupy a new building. In the fall of 1907 architects were employed to draw up plans and specifications for a building that should meet the needs of the University for a number of years. The Regents approved plans for a four-story building, 270 feet in length and 150 feet wide, with provision for about 950 laboratory tables and a liberal allowance of rooms for special research and staff accommodation. But when the plans were submitted to the contractors for bids in the following spring, the estimates were so high that it became necessary to reduce the size of the structure. Accordingly, new plans were approved for a four-story building 230 feet long and 130 feet wide, and contracts for its erection were authorized on September 24, 1908. The structure retained essential features of design and arrangement shown by the first plan, but the number of laboratory tables was reduced to 634. Fortunately, only a minor reduction of accommodations for research and for the staff was necessitated. By October of 1909 the present building was so nearly completed that some courses were given in the new laboratories during the first semester of that academic year, and the remaining courses were transferred at the beginning of the second semester, in February, 1910.

During the decade 1910-20 an unprecedented increase in the number of students attending the University overtaxed the original equipment of the new laboratory. To alleviate growing pains, changes in table equipment were made from time to time. Space required for storage of each student's personal apparatus and supplies was reduced by re-

building table lockers. Fortunately, the original design of the tables and the distribution of gas, water, and waste lines to them permitted this reduction of locker spacing without involving too great an expense. Locker accommodations of laboratory tables for beginning courses, situated on the fourth floor, have been doubled, and in this way table space has been provided for approximately 1,000 students, of whom 250 may occupy the laboratories at one time. For more advanced work it was not feasible to reduce locker dimensions to so great an extent, but an increase of 50 per cent in the number of lockers has been made for tables in all advanced laboratories. It is not possible to proceed further in this direction, for locker spacing is now at an irreducible minimum.

The transfer of the Department of Chemical Engineering to the East Engineering Building in 1923 relieved congestion both in the laboratory and in the chemical library. Part of the vacated laboratory and office space has been used for advanced laboratory courses and research in the several divisions of pure chemistry and in pharmacy, and an opportunity has thus been provided for a change in the organization and functions of the laboratory dispensing department. A new laboratory was equipped for electrochemistry, and several smaller rooms were made available for research in this field. The general laboratory, into which all regular course work of physical chemistry had been crowded, was equipped as a special laboratory for colloid chemistry, and more ample accommodations were found for the general course work in physical chemistry. Similarly, new laboratories were established for advanced work in analytical and organic chemistry, and increased facilities were provided for research in these two departmental units. Likewise, a prescription laboratory was equipped for the

College of Pharmacy, and extra space was given over to the College for research.

Hitherto, the dispensing department had been charged with the handling of student accounts and had supplied apparatus and chemicals, mainly to the chemical laboratory. At the June meeting in 1923, the Board of Regents initiated a new policy for the distribution of such materials, through the establishment of a University Chemical Storehouse, of which the dispensing arrangements for the chemical laboratory should be a part. The resolution of the Board reads as follows:

The University Chemical Storehouse shall be assigned quarters now occupied by the dispensing rooms in the Chemical Laboratory, and in addition Rooms 126, 128, 132, 136, 138 and 227 of the Chemical Laboratory Professor Robert J. Carney shall be in charge of the University Chemical Storehouse, and it shall be operated as a part of the business organization of the University for the service of all University work in chemistry, and . . . responsibility of Professor Carney as head of this work shall be to the Secretary of the University. (*R.P.*, 1920-23, p. 856.)

The new policy is a result of the continued increase in scientific laboratory work done by many departments of the University, for which the purchase and distribution of apparatus and supplies has become an important problem. The University Chemical Storehouse furnishes apparatus, chemicals, and other supplies on requisition to all departments, to individual faculty members, and to students. The change has resulted in a considerable saving to all departments using laboratory materials, and has made available an excellent, diversified stock. During the fourteen years of its existence the yearly net receipts have increased from \$23,000 to more than \$86,000. If the materials supplied to the

Department of Chemistry and to the College of Pharmacy are taken into account, the annual business of the University Chemical Storehouse is now considerably more than \$100,000. Besides the regular dispensing employees, a glass blower is engaged to repair apparatus and construct special equipment, so essential to modern research. The Storehouse also furnishes employment to a number of student assistants.

In February, 1926, an advanced course in gas analysis was offered for the first time in a laboratory newly equipped for this service. This is the most recent special laboratory to be established in the building for regular course instruction. Naturally, equipment of research rooms changes from time to time as new problems are developed for investigation. Pressure to offer laboratory work in organic chemistry to students in training for admission to a medical school was met for several years by providing extra facilities in the summer session. When the Medical School made laboratory work in organic chemistry an absolute requirement for all students entering in 1933 and thereafter, it became impracticable to require a summer session for this work. Accordingly, space that is provided with equipment suitable for organic chemistry has been borrowed temporarily in the general pharmacy laboratory. This has been possible because the growth in the number of pharmacy students has not kept pace with the numerical increase of the students enrolled in chemistry, since a four-year training period is now required of pharmacy students, and all shorter periods of training for the pharmaceutical profession have been discontinued. Although the borrowing of space for the use of premedical students continues, it may not be permitted to jeopardize the natural growth of facilities for the use of the students of pharmacy.

II. ORGANIZATION OF THE CHEMICAL LABORATORY

EARLY ORGANIZATION.—No need existed for divisions within the Department of Chemistry until the scope of laboratory work was expanded to include several independent fields of application. Prior to the establishment of the Michigan Agricultural College (now Michigan State College of Agriculture and Applied Science) at East Lansing in 1855, lectures on agricultural chemistry had been offered in the Department of Chemistry. The subject has not been developed further, however, because those responsible for chemistry here felt that agricultural chemistry should be promoted entirely within the Michigan Agricultural College. Association with the Department of Medicine and Surgery was given up eventually to allow expansion of medical interests elsewhere, and of other work in the Chemistry Building. Instruction in hygiene was transferred in 1888 to the building erected for the laboratories of hygiene and physics, and the laboratory work in physiological chemistry was removed on completion of a new medical building (now called West Medical Building) in 1903. The departmental units that were left in the Chemical Laboratory Building at that time were those in chemical engineering, pure chemistry, and pharmacy. These remained together until 1923, when the work in chemical engineering was transferred from the present Chemistry Building to quarters in the East Engineering Building.

Since the Department of Chemistry has always served all schools and colleges of the University except the Law School, responsibility for teaching chemistry and for the needs of the laboratory was vested in a director of the chemical laboratory. Silas H. Douglass was the first appointee and held office from 1870 until his resignation in 1877. A successor was

not appointed until 1884, when Professor Albert B. Prescott was designated Director of the Chemical Laboratory. He was responsible for both the chemical laboratory and the School of Pharmacy until the time of his death in 1905.

THE LABORATORY OF GENERAL CHEMISTRY.—During the early seventies the rapid development of industries, particularly in iron and steel metallurgy, gave rise to a demand for chemists especially trained in analyses of metallurgical and other industrial materials. The University responded by offering courses and developing research in chemical technology. The promotion of training toward professional chemistry then led to an organization of general chemistry and to the development of laboratory instruction in beginning phases of the work. In 1880 the laboratory of general chemistry was set up under an administration separate from that of analytical, applied, and organic chemistry. Ultimately, it received a status not unlike that of the "second chemical laboratory" of some European universities. Paul C. Freer became its first and only Director in 1891. Nominally, he served until his resignation in 1904, but he was away on leave of absence in the Philippine Islands from 1901 to 1904. For this period S. Lawrence Bigelow was appointed acting head of the department, and he was continued in this position until 1905, when several changes were made in the administration of units within the chemical laboratory, occasioned by the death of Professor Prescott. Physical chemistry was then administered with general chemistry under the guidance of Professor Bigelow, and the directorship of the laboratory of general chemistry was abandoned. At the same time the elementary lecture course hitherto given by Smeaton in the curriculums of the Department of Engineering was transferred to the Department of General and Physical Chemistry,

which was placed on the same footing as the Department of Analytical and Organic Chemistry. Between 1895 and 1900, laboratory work in physical chemistry received initial development within the Department of General Chemistry, Bigelow having been called to the University in 1898 to promote the work. This field has had rapid and wide expansion, in keeping with general trends of the period.

LATER ORGANIZATION.—In 1905, after the death of Prescott, the School of Pharmacy and the chemical laboratory ceased to have the same administrative head, and the approach toward the establishment of a "second chemical laboratory" was given up. The chemical laboratory, minus its offshoots in the Department of Medicine and Surgery, the Department of Engineering, and the School of Pharmacy, was once more unified, and Professor Edward D. Campbell, head of the Department of Chemical Engineering and Professor of Analytical Chemistry, was made Director. Campbell resigned the professorship of chemical engineering in 1914, but he retained his other positions until his death in 1925. After a brief delay Moses Gomberg, Professor of Organic Chemistry, was made Chairman of the Department of Chemistry. The directorship of the laboratory was then discontinued. There seemed no longer any need for it, since Robert J. Carney, as head of the University Chemical Storehouse, was responsible for the building and its supplies. When Gomberg reached the age for retirement, in February, 1936, Chester S. Schoepfle was appointed Professor of Organic Chemistry and Chairman of the Department of Chemistry. The affairs of the department are administered by the chairman and an executive committee selected from the teaching staff. Matters pertaining to the budget are in the hands of the chairman and of a committee com-

prising staff members of full professorial rank.

PROFESSIONAL TRAINING IN CHEMISTRY IN THE DEPARTMENT OF CHEMICAL ENGINEERING.—University recognition of professional training for chemists came first in 1884, when a curriculum leading to the degree of bachelor of science in chemistry was organized in the Department of Literature, Science, and the Arts. The degree was first conferred in 1886, the recipients being Edward D. Campbell, Louis M. Dennis, and Frederick G. Novy, but was abolished in 1896, along with the special degree in biology, except for students who had already begun the course. The last of these students graduated in 1899. In place of this course a new curriculum leading to the degree of bachelor of science in chemical engineering was set up in 1898 in the College (then called Department) of Engineering. The new course resembled the old, except for the inclusion of engineering studies. In this way arose the Department of Chemical and Metallurgical Engineering (see Part VII). Until 1909 students in this department had all their classes in chemistry and in chemical engineering in the old Chemical Laboratory Building, under men of both the engineering and the literary faculties. These classes were thereafter conducted in the present Chemistry and Pharmacy Building until 1923. By 1920 the advisability of removing this work from the chemical laboratory had become apparent. There was a need of more room in which new technological projects could be promoted, and pressure was added also by an urge to develop new courses in physical chemistry and by the crowding of regular laboratory work throughout the Department of Chemistry. The work in chemical engineering was transferred to the new East Engineering Building in 1923. At the time of this transfer there was an adjustment of

ownership rights to scientific journals and reference works, for which joint subscriptions had been made by the two departments, and many volumes were removed to the East Engineering Building.

From 1898 on, the courses in chemical engineering offered the only means of training students for the profession of chemistry. But a demand arose for a training that would include more chemistry than was possible in the engineering course. This was met by re-establishing the curriculum leading to the degree of bachelor of science in chemistry in the College of Literature, Science, and the Arts. The reinstated degree was conferred for the first time in 1916. Interest in this curriculum has not waned. A further advance in the standards of professional chemical training was made in 1919, when the Regents authorized the Graduate School to announce the degree of master of science in chemistry. To obtain this degree the candidate must have completed all requirements for the degree of bachelor of science in chemistry and also a full year of graduate training in chemistry and cognate subjects, as prescribed by the Department of Chemistry. More and more, this degree is being regarded as a step on the way to the several doctorates that represent final training for the profession.

PROFESSIONAL TRAINING IN CHEMISTRY IN THE SCHOOL OF PHARMACY.—As early as 1860, courses in pharmacy were offered in conjunction with analytical chemistry, and in 1868 a two-year curriculum was set up, leading to the degree of pharmaceutical chemist. Within the next few years work in pharmacy was expanded so greatly that the Regents established the School of Pharmacy within the chemical laboratory as a separate department, and Albert B. Prescott was chosen its first Dean in 1876 (see Part VII: COLLEGE OF PHARMACY). When, in 1905, Julius O. Schlotterbeck succeeded

Prescott as Dean of the School of Pharmacy, the administrative control of the school was separated permanently from that of the chemical laboratory.

III. ENROLLMENTS IN THE CHEMICAL LABORATORY

For the two semesters of 1908-9, the last year in which the old building was occupied, 2,599 students in all were enrolled for classwork, and 1,271 had work in laboratory courses. Three University units—the Department of Literature, Science, and the Arts, the Department of Engineering, and the School of Pharmacy—furnished 74.5 per cent of all students in chemistry classes and 81.7 per cent of those in laboratory work. Students in the two medical schools and in the College of Dental Surgery, who then were required to present chemistry as a part of their professional training, made up 24.5 per cent of the class and 16.3 per cent of the laboratory registrations. The Graduate School accounted for the remainder—a total of twenty-five graduate students in the classes and twenty-eight in the laboratory courses. Seven years later, registrations from the medical schools had become insignificant, since medical students were by that time required to present chemistry as a part of their premedical training, and in 1927-28 students from the School of Dentistry had disappeared for a similar reason. In the year 1915-16 the four schools and colleges furnished a total enrollment of 3,497 for classwork and 2,253 for laboratory work. Thus within six years after the present building was occupied, class enrollments had increased 34.5 per cent, and laboratory registrations had shown a 77.3 per cent gain, necessitating reconstruction of nearly all laboratory-table equipment. In 1924, the year after the removal of the work in chemical engineering to new quarters, registrations



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totalled 2,525 for classes and 2,033 for laboratory work. Of these, 2,320 in classes and 1,933 in laboratory work were registered in pure chemistry and the remainder were in pharmacy. Total registrations have fluctuated considerably during the depression years, but recently they have shown a continuous increase, totaling 36 per cent in class enrollments and 32 per cent in laboratory enrollments in the four years ending in 1938.

A steadily mounting interest in chemistry as a field of graduate study is particularly gratifying to the departmental staff. In the old laboratory, graduate students rarely constituted even an integral percentage of total registrations, and in the maximum, never more than 2 per cent. Increased facilities provided by the present Chemistry Building have attracted graduate students in constantly increasing numbers. Occasionally, during the first fourteen years of its occupancy, they have made up as much as 5 per cent of the total enrollment. From the time when the Department of Chemical Engineering was removed, in 1923, until the end of June, 1930, graduate students constituted more than 7 per cent of both class and laboratory enrollment. The number listed in separate class and laboratory courses for 1929-30 was 385. In the following year it had increased to 562, and the enhanced interest has been maintained. For 1935-36 the graduate enrollment in pure chemistry was 740, representing 13.5 per cent of all students.

This trend is shown even more markedly by registrations for the summer session, and also by the number of professional and advanced degrees conferred on students from the department. Chemistry has been offered in the summer session ever since summer work was begun in 1894, as well as in the special summer school of chemistry conducted in 1890 (see Part IV: SUMMER SESSION). An occasional graduate student registered for

the six-week period of summer session work in the old chemical laboratory. In the summer session of 1910, when the first summer laboratory work in chemistry was offered in the present building, the thirty-two graduate students represented 10.4 per cent of the registration total in the department. During the next fourteen years the proportion grew slightly, but there was some fluctuation. The session of 1924 witnessed a decisive increase to 23 per cent of total registrations, and the rate of increase rose steadily over the next four-year period until, in 1928, graduate enrollment had become 35.8 per cent of the total registrations. The following year another marked increase raised the proportion to 50.7 per cent, and, ever since, a majority of chemistry students in the summer session have been graduates. A peak was reached in 1932 with a 60 per cent graduate enrollment. The small diminution in the interim may be attributed to partial recovery of chemical industries from the effects of the business depression.

By the end of June, 1940, 207 students had received the degree of bachelor of science in chemistry since the curriculum leading to it had been re-established, an average of eight per year for the period of twenty-five years. The strictly professional degree, master of science in chemistry, was conferred on eighty persons from the time of its establishment in 1919 through June, 1940, but of the entire list of students receiving the master's degree with specialization in chemistry, this number represents only a minority. In the first forty years of this century, 168 persons specializing in chemistry received either the doctor of philosophy or the doctor of science degree. Prior to the occupancy of the present laboratory only five of this group had received doctorates, but the continuity in conferring the doctor's degrees has been unbroken since 1909. In

the first two decades, from 1900 to 1920, doctorates in chemistry were conferred on a total of thirty-two persons. The next decade added forty-five to the list, and in the years 1930-40 the number of doctor's degrees in chemistry was ninety-one.

IV. THE CHEMISTRY LIBRARY

An abundant journal and monograph literature is a most important part of that equipment which is essential to productive research and teaching. Ever since the first Chemical Laboratory Building was erected, in 1856, the department has provided for faculty and student use numerous standard reference works, monographs, and periodicals, both domestic and foreign, that contain articles on chemistry and in cognate fields. The General Library has acquired works on chemistry as new projects have been undertaken in the laboratory. In the course of time a room was set aside in the Chemical Laboratory Building to house a few of the works that were indispensable laboratory equipment. No regular library service was ever provided in the old building. Plans for the present laboratory called for a combined library and reading-room on the second floor, with very particular safeguards against possible damage from fumes or from leakage of waste lines. The room has accommodations for ninety readers, and can house about 14,000 volumes. It contains chiefly journals and monographs, with relatively few textbooks. Owing to the depression, subscriptions to seven journals devoted to pharmacy, and to twenty-three pertaining to chemistry, were discontinued, leaving 144 periodical subscriptions still carried. The diminished buying powers of the library, which represents the very lifeblood of an institution of higher learning, are due largely to the depreciation of American currency in foreign markets, from which many

books, monographs, and journals must come.

Older volumes of various journal sets are kept in the General Library. An unusually comprehensive historical collection and a special collection of textbooks and reference works for secondary schools are noteworthy minor features of the chemical library. The department offers various seminars as well as instructional courses in the history of chemistry and in chemical literature, all of which require use of the library. In a course in chemical literature under Professor Soule, the more advanced students are assisted in locating information on works dealing with chemistry.

V. DEPARTMENTAL TEACHING AND RESEARCH

Three periods offer a convenient chronology for depicting the organization of divisions within the Department of Chemistry and the foundation of its research programs. In the first period the Department of Chemistry and the Medical School, then known as the Department of Medicine and Surgery, entered into a mutually beneficial symbiosis. The old Medical Building housed the first chemical laboratory work, and in turn the original Chemical Laboratory Building housed the medical laboratories of hygiene and physiological chemistry until the erection of other more appropriate buildings permitted their withdrawal. Moreover, the arrangement was in keeping with the scientific spirit of that time, and particularly with the training and predilections of Professor Silas H. Douglass, who served the two departments impartially.

Gradual expansion of activities along independent lines in both the Department of Chemistry and the Department of Medicine and Surgery loosened the symbiotic tie in the second period, and it was severed with the erection of the

present Chemistry Building (1909). During most of this time the destinies of the laboratory were in the capable hands of Professor Albert B. Prescott. The period brought to completion the organization of four main divisions within the Department of Chemistry and subsequently a transfer of numerous activities that pertain to chemical technology from the jurisdiction of the Department of Literature, Science, and the Arts to that of the Department of Engineering. It saw the perfecting of the organization of the School of Pharmacy and its subsequent administrative separation from the Department of Chemistry. Most significant was the beginning of productive research, which led to the establishment of subdivisions within departmental units of chemistry.

Edward D. Campbell guided the laboratory over the difficulties of transfer from the old to the new building. The new laboratory permitted expansion of teaching and a much wider development of research in pharmacy, chemical engineering, and chemistry. Opportunity to receive adequate training for the profession of chemistry again was provided to students in the College of Literature, Science, and the Arts. The ultimate parting of the Department of Chemical Engineering from its foster parent toward the close of Professor Campbell's regime offered further opportunity to project chemical research. Hence, a marked increase in the number of graduate students of chemistry and a corresponding augmentation of research are outstanding features in the history of the laboratory during the entire period of Gombert's administration, and the same situation continues under the chairmanship of Professor Schoepfle.

CHEMISTRY AND MEDICINE.—Up to his resignation in 1877 Silas Hamilton Douglass (A.M. hon. Vermont '47) had served the University for thirty-three years.

Coming here in 1844 as an assistant to the Professor of Chemistry, he became Lecturer on Chemistry and Geology in the following year. After the accidental death of Douglass Houghton he was appointed Professor of Chemistry, Mineralogy, and Geology. At times before 1870, he also held the professorships of pharmacy, materia medica, medical jurisprudence, and toxicology. In this year he became the first Director of the Chemical Laboratory and held only the single professorship of chemistry until 1875, when his title became Professor of Metallurgy and Chemical Technology. For the first thirteen years he taught all chemistry courses without help, except such as could be rendered by student assistants. Alfred DuBois ('48, A.M. '54), who had acted as assistant from 1855 to 1857, received appointment to the second position on the staff as Assistant Professor of Chemistry in 1857, and served until his resignation in 1863.

He was succeeded by Albert Benjamin Prescott ('64m, Ph.D. hon. '86), who also had been an assistant from 1862 to 1864. Prescott was Assistant Professor of Chemistry and Lecturer on Organic Chemistry and Metallurgy from 1865 to 1870, when he became Professor of Organic and Applied Chemistry and of Pharmacy. Similarly, Victor Clarence Vaughan (Ph.D. '76, '78m, LL.D. '00) began his teaching career under Professors Douglass and Prescott as an assistant in the Chemical Laboratory from 1875 to 1883. He was Lecturer on Medical Chemistry in 1879-80, and Assistant Professor of Medical Chemistry from 1880 to 1883. His earlier papers on physiological chemistry represent contributions from the chemical laboratory, as do those of Preston Benjamin Rose ('62m), assistant for nine years and Assistant Professor of Physiological Chemistry in 1875 and from 1879 to 1881 (see Part I: DOUGLAS-ROSE CONTROVERSY). Otis Coe

Johnson (Oberlin '68, A.M. *ibid.* '77, Michigan '71p) also served as an assistant in the Chemical Laboratory from 1873 to 1880, when he was appointed Assistant Professor of Applied Chemistry. He was raised to the professorship in 1889. Johnson was appointed Professor of Qualitative Analysis in 1906 and in 1911 was retired as Professor Emeritus. John Williams Langley (Harvard '61, M.D. hon. Michigan '77, Ph.D. hon. *ibid.* '92) was the last to be appointed to the chemistry staff during the regime of Professor Douglass. He served both in the Department of Chemistry and in the Department of Physics as Acting Professor and Professor, 1875 to 1877, when he gave up the chair of physics. As Professor of General Chemistry from 1877 to 1888 he organized the first instruction in this field. Langley became Professor of General Chemistry and Metallurgy in 1888, but he had a leave of absence in this year, and the following year he resigned to take up metallurgical work with an industrial concern in Pittsburgh. He served as Nonresident Lecturer on the Metallurgy of Steel from 1889 to 1892. During Langley's leave of absence in 1888-89, Lucius Lincoln Van Slyke ('79, Ph.D. '82) carried his teaching duties in general chemistry. While in the University Langley published valuable contributions to metallurgy and chemistry.

During the period of Douglass' activity, the laboratory staff had grown to four regular teachers and two assistants, who had organized work in analytical, organic, and general chemistry, and also in the several applications to medicine, pharmacy, and technology. Professor Douglass bore a heavy burden of teaching and administration. In January, 1847, he was made Inspector of the Buildings and Grounds of the University, holding the post until 1851. He submitted the plans for the second University building, the South College, now known as the

South Wing, and superintended its erection in 1848. His plans for the old Medical Building, including a chemical audience room, were submitted in 1848, and, when the building was finally erected, he also superintended its construction. He planned and superintended the construction of the first Chemical Laboratory Building and arranged for its equipment and for four of its additions. He had in charge the erection of the Observatory and of other University construction. Likewise, he was active in the establishment of the Department of Medicine and Surgery, in which he taught for many years. In shifting the fields of his own teaching he demonstrated great versatility and unusual capabilities, and he rendered signal service to the University by providing the nucleus of an admirable teaching organization, comprising Professors Prescott, Vaughan, Johnson, and Langley. To public demand for chemical reports on topics pertaining to general welfare he always responded willingly.

Douglass' *Guide to a Systematic Correction of Qualitative Chemical Analysis* (1864) was incorporated, ten years after its first publication, in a textbook *Qualitative Chemical Analysis*, under the joint authorship of Professors Douglass and Prescott. A fourth edition, rewritten by Professors Prescott and Johnson, long had vogue as a standard text and reference work in this field. The writer of this article used it in the early nineties while an undergraduate at the University of Toronto. A ninth, and the most recent, edition of the text was rewritten by Professors McAlpine and Soule in 1933.

The first original contribution from the chemical laboratory was a paper on "The Blow-pipe Assay," published by Prescott in the *Engineering and Mining Journal* for 1869. His name as author appears on 126 research papers, scientific addresses, monographs, and textbooks,

and, together with *Contributions from the Chemical Laboratory of the University of Michigan*, representing researches published in the names of students who were working under his direction, the whole of his contributions would amount to some two hundred articles. His monograph, *The Chemical Examination of Alcoholic Liquors*, and the two textbooks of organic chemistry, *Outlines of Proximate Organic Analysis* and *Organic Analysis*, were considered authoritative works for many years. Chemistry, medicine, pharmacy, and the teaching profession have derived lasting benefits from his example and precepts. The renown of the University was augmented by his service in behalf of state and national pharmacy, and by his election to the national presidency of both the American Chemical Society and the American Association for the Advancement of Science. Many students trained by him in pharmacy and chemistry have become leaders in teaching and in industry, both at home and abroad. The following are noteworthy: the late Alfred Senier ('74, '74m, Ph.D. Berlin '87), Professor of Chemistry in Queen's College, Galway; the late Abram Van Eps Young (75, '75p), Professor of Chemistry in Northwestern University; the late Lucius Lincoln Van Slyke, Professor of Dairy Chemistry in Cornell University; Louis Munroe Dennis (Ph.B. '85, B.S. [Chem.] '86, Sc.D. hon. '26), Professor of Chemistry in Cornell University; Bernhard Conrad Hesse ('89p, '93, Ph.D. Chicago '96), formerly research chemist with the Badische Anilin u. Soda Fabrik and latterly internationally known consulting chemist of New York City.

EXPANSION AND SPECIALIZATION.—Under the guidance of Professor Prescott, from 1876 to 1905, the expansion and co-ordination of laboratory work was continued. He relinquished teaching in metallurgy and applied chemistry to

devote more time to pharmacy, and ultimately to organic chemistry exclusively. In 1881 Dr. Byron William Cheever ('63, '67m, '75l) became Acting Professor of Metallurgy; he continued in this position until his death in 1888. Under his direction, work in metallurgy became allied closely with quantitative chemical analysis, which now was offered as a separate course in analytical chemistry. Cheever had very high ideals of scholarship. Besides eight valuable papers on metallurgical research he published *Select Methods in Quantitative Analysis*, a work of great merit. Professor Johnson was charged with the duty of lecturing on general applied chemistry. As applications to engineering industries multiplied, his activity in this field ceased. He developed comprehensive courses of instruction in qualitative chemical analysis, to which he remained devoted until he retired. After the time of Cheever and Langley, responsibility for metallurgy and quantitative analysis was placed in the hands of Edward D. Campbell ('86), who later became Director of the Chemical Laboratory and also Chairman of the Department of Chemical Engineering. His influence procured the services of Alfred Holmes White ('93, '04e), who came in 1897 from the Federal Polytechnicum of Zurich to develop new work in chemical technology. Soon afterward, when action by the faculty of the Department of Literature, Science, and the Arts abolished certain special degrees, the Department of Chemical Engineering was founded. Responsibility for teaching chemical technology has remained with this department, in which White succeeded Campbell as chairman in 1914.

Altogether, ten other members of the instructing staff taught analytical or technological chemistry in the old building. Frederick Levy Dunlap ('92, ScD. Harvard '95), Eugene Cornelius Sullivan ('94, Ph.D. Leipzig '99), and Hobart

Hurd Willard ('03, Ph.D. Harvard '09) all taught analytical chemistry during Prescott's time. Dunlap resigned in 1907 to become a member of the Federal Board of Food and Drug Inspection. Sullivan went to the United States Geological Survey in 1903, and afterward he developed pyrex ware at the Corning Glass Works. He is now president of the Corning Glass Company. Willard held an acting instructorship from 1903 to 1905, when he became Instructor in Qualitative Analysis. He held a fellowship at Harvard University for two years, completing research there in the field of atomic-weight determination with Professor Theodore W. Richards. In 1925 he succeeded Professor Campbell as head of the Department of Analytical Chemistry. Karl Wilhelmj Zimmerschied ('03, M.S. '04) taught quantitative analysis and metallurgy from 1902 to 1912. He developed the first courses of instruction in metallography. Entering the employ of the General Motors Corporation in 1912, he was for some time president of the Chevrolet Motor Company. In 1907 Harry Newton Cole ('01, '06, M.S. '15) and Robert John Carney ('07, Ph.D. '16) came to the staff in qualitative analysis and have continued teaching in this division. Cole was retired as Instructor in 1935. Assistant Professor Carney has become Director of the University Chemical Storehouse and has retained only a part of his teaching. He has developed courses of instruction in microchemical analysis and in the chemistry of the rare earths. The other instructors in analytical and applied chemistry have left after very short periods of service.

Instruction leading to the degree of pharmaceutical chemist (Ph.C.) had become a proving ground for the profession of chemistry. Dean Prescott did not discontinue teaching pharmacy until he had provided an adequate staff for the School. When this was accomplished he devoted

more time to instruction in organic chemistry and to the development of research. Theodore John Wrampelmeier ('78, '78p), at first his private assistant and later Instructor of Analytical Chemistry, became Assistant Professor of Organic Chemistry and Pharmacy in 1885, but ill health led to his resignation a year later. Afterward he became foreign representative in London for the E. I. du Pont de Nemours Powder Company, and still later was a noted consulting chemist and chemical engineer in New York City.

The nucleus of a separate staff for the School of Pharmacy was provided in the persons of Alviso Burdett Stevens ('75, Ph.D. Bern '05) and Julius Otto Schlotterbeck ('91, '87p, Ph.D. Bern '96). Stevens succeeded Theodore Wrampelmeier in 1886 as Instructor of Pharmacy, and Schlotterbeck developed instruction in pharmacognosy. Both gave long years of service to the School, and both have served it as dean. Only one other instructor came to this staff during the administration of Dr. Prescott.

Professors Rose and Vaughan continued their teaching activity in medical chemistry. Similarly, Frederick George Novy ('86, Sc.D. '90, '91m) diverted his interests to medicine and taught medical chemistry in the old laboratory from 1887 until 1902. He and Moses Gomberg ('90, Sc.D. '94) are outstanding among students who have received from Prescott inspiration to carry on graduate research. On the shoulders of Gomberg has come to rest the mantle of Professor Prescott as investigator, teacher, and administrator in the Department of Chemistry. He succeeded to the professorship of organic chemistry and to the chairmanship of the department. Five other staff members taught organic chemistry during Professor Prescott's regime. Among them, Perry Fox Trowbridge ('92, Ph.D. Illinois '06) is the only one who remained with the department for

more than a year or two. He served as Instructor in Organic Chemistry from 1895 to 1902, and afterward became director of the Agricultural Experiment Station at North Dakota Agricultural College.

Following Professors Langley and Van Slyke, Paul Caspar Freer (M.D. Rush Medical '82, Ph.D. Munich '87) became Lecturer on General Chemistry in 1889. The next year he was appointed Professor of General Chemistry and Director of the Laboratory of General Chemistry. Under his direction the organization of teaching in this field was completed. He gathered a corps of instructors and published textbooks for use in the classes. His *Descriptive Inorganic General Chemistry* and *Elements of Chemistry* were popular college texts for a number of years. Freer preferred research activity in organic chemistry, and he has published a number of papers in this field. He was absent on leave in the Philippine Islands from 1901 to 1904, when he resigned to become director of the Government Scientific Laboratories at Manila. During his regime, class and laboratory work in physical chemistry was added to the activities of the Department of General Chemistry. In the interim this has become an important field for original investigations.

Between 1889 and 1905 twelve men were appointed to the teaching staff in general chemistry. The first three had been students in the department. George Oswin Higley ('91, Ph.D. '05) served as Instructor from 1891 to 1905, when he became Professor of Chemistry at Ohio Wesleyan University. David Martin Lichty (West Chester Normal '87, Ph.D. Heidelberg '07) served on the staff of the department from 1891 until his retirement as Associate Professor Emeritus in 1932. After working on his doctoral studies at the University of Heidelberg from 1905 to 1907 he returned to the

University of Michigan and became Assistant Professor of General Chemistry. For many years Lichty had charge of elementary general chemistry for students of pharmacy and dentistry. Two instructors who had been trained in the University of Munich were appointed in 1896. They both remained for only a short period of service, during which they collaborated with Paul C. Freer in organic research. Two years later another influx of German-trained staff members was begun, with the appointment of Samuel Lawrence Bigelow (A.B. Harvard '91, B.S. Massachusetts Institute of Technology '95, Ph.D. Leipzig '98) from the Physical-Chemical Institute of the University of Leipzig. Five staff members came to the department from this institute during the next seven years.

Bigelow was charged with the development of instruction in physical chemistry, and he had teaching duties also in general chemistry. To promote laboratory instruction and research in physical chemistry he procured the appointment of George Augustus Hulett (Princeton '92, Ph.D. Leipzig '98) in 1899. Hulett stayed until 1905, when he resigned as Assistant Professor of Physical Chemistry to become a member of the chemistry staff at Princeton University. He was an indefatigable research worker. During his stay the laboratory of physical chemistry was well equipped and organized, and it gained an enviable reputation for productive research. The tradition was upheld by Samuel Colville Lind (A.B. Washington and Lee '99, S.B. Massachusetts Institute of Technology '02, Ph.D. Leipzig '05), who succeeded Hulett in 1905. He resigned as Assistant Professor of General and Physical Chemistry in 1915, to enter the service of the United States Bureau of Mines at Reno, Nevada. Lind is now dean of the combined Schools of Chemistry and Chemi-

cal Engineering at the University of Minnesota. Bigelow took over the teaching and administrative duties of Freer during the latter's absence on leave and succeeded him in the chair of general chemistry, later becoming Professor of General and Physical Chemistry.

The Department of Engineering had requested separate instruction in general chemistry for engineering students, but Freer was unwilling to permit such a course to be developed. Because of this William Gabb Smeaton (Toronto '98) was called from the Physical-Chemical Institute at Leipzig in 1902 to develop a lecture course for engineering students. This separate division of general chemistry was merged with the regular department in 1905. Smeaton had charge of the course until 1919, when he took over the teaching duties of William Jay Hale (Miami '97, Ph.D. Harvard '02), Associate Professor of General Chemistry. Hale had come to the department in 1903 charged with responsibility for one of the several parallel lecture courses in elementary general chemistry; he had become Assistant Professor in 1908 and Associate Professor in 1915. He resigned in 1919 to become director of organic research with the Dow Chemical Company. Hale had been associated with Professor Alexander Smith at Chicago, and had collaborated in the preparation of the laboratory manual to accompany Smith's *Introduction to General Inorganic Chemistry*. Later, the manual was published separately by Hale. Smeaton has revised and rewritten all recent issues of the manual. Another valuable work, *Calculations of General Chemistry*, was written by Hale while in the University. He promoted research in organic chemistry and published fifty original papers, of which a number are joint contributions with research students.

CHEMISTRY IN THE NEW BUILDING.—Within the period of occupancy of

the old Chemistry Laboratory Building forty-five full-time staff members gave instruction in medical chemistry, pharmacy, chemical engineering, and pure chemistry. Sixteen came over to the present building when the transfer of work in pharmacy, chemical engineering, and chemistry was made in 1909, and two additional instructors were appointed then. In June, 1940, nineteen men of the rank of instructor or higher were teaching in the Department of Chemistry. The number of chemistry students has become so large that in order to conduct the many laboratory and quiz sections the department has adopted the policy of providing teaching fellows, who devote half time to assigned duties with laboratory and quiz sections and in their own interests elect advanced courses and carry on research leading to advanced degrees. Teaching fellows may be reappointed for a period not exceeding three years. They are chosen by a departmental committee on the basis of qualifications for both teaching and research. Generally there is an abundance of qualified applicants. All three divisions of chemistry make use of their services, but the majority are needed for duties with beginning courses, principally in elementary general chemistry, which may have from 650 to 800 or more elections. From 1913-14 to 1927-28 the number of teaching fellows has averaged twelve a year, from a minimum of nine to a maximum of fifteen.

Some years ago the staff in general chemistry made an exhaustive study of problems connected with efficiency of laboratory instruction. Opinions were gathered from departmental staffs in other universities that had laboratory problems similar to our own. The outcome was a recommendation that the administration should increase the number of teaching fellows to provide instruction for laboratory groups of approximately twenty students. Increases have been slow in

coming, but ultimately the desired end was attained in 1931-32, when eighteen teaching fellows were appointed. But the number was reduced to sixteen in the following year, to thirteen a year later, and to eleven in 1934-35, owing to a need for retrenchment. The regular teaching staff had at that time been diminished by several retirements for which no replacements have been made. For the year 1936-37 the Department of Chemistry had five fewer teaching fellows and three fewer members of the full-time staff than it had in 1931-32, and it cared for 37.4 per cent more students than were enrolled in 1931-32; but in 1939-40 there were nineteen teaching fellows in addition to nineteen regular staff members. Fortunately, the number of University fellowships and of other nonteaching fellowships supported by various industries was not diminished greatly during the depression period. Frequently, recruits for temporary instructorships to replace staff members on leave of absence are found among those who have finished a period of service as teaching fellows.

A few days before the beginning of spring vacation in 1892 Professor E. D. Campbell lost both eyes in a laboratory explosion. When work was resumed after the recess he met his classes with a bandage over the forehead. For the next thirty-three years, in spite of his great handicap, he was active in research. During later years he discontinued lecturing, but he carried on the duties of administration and the direction of research students throughout his lifetime. Professor Campbell learned through the sight and touch of his colleagues and students. He developed a remarkably retentive memory, an amazing capacity to visualize operations and trends of research problems, and an unusually delicate sense of touch. The writer has often watched him adjust a delicate mechanism, to

which his hands had been guided and for which, alas, one's own hands were all too clumsy. His first original investigation was conducted in his senior college year, when he was assistant to Professor Cheever. It bore the title, "A Colorimetric Process for Estimating Phosphorus in Iron and Steel." Altogether, he published twenty-three papers on analysis of iron and steel, fourteen on the constitution of Portland cement, and forty that deal with correlations of chemical and physical properties in steel. Colleagues in the Iron and Steel Institute of Great Britain considered Campbell an authority in their field. He was revered by all who had personal intimacy with him.

Teaching and administration of quantitative analysis gradually came into the capable hands of Hobart Hurd Willard, who has developed courses to include all phases of inorganic analysis. Clifford Cyrille Meloche (Wisconsin '10, Ph.D. *ibid.* '14), Assistant Professor of Analytical Chemistry, is his associate in teaching regular course work in quantitative analysis. Meloche has organized a special field of work in gas analysis. Roy Kenneth McAlpine ('06, Ph.D. '21) and Byron Avery Soule (18, Sc.D. '24), both assistant professors of analytical chemistry, are associated with Assistant Professor Carney in regular course work of qualitative analysis. Besides collaborating in rewriting the *Textbook of Qualitative Chemical Analysis* of Prescott and Johnson, they published jointly in 1936 *Fundamentals of Qualitative Chemical Analysis*, a textbook that is finding favor for use of classes in colleges and universities. McAlpine offers courses to aid candidates who are preparing to teach chemistry in secondary schools, and he conducts research in the field of atomic-weight measurement. Soule has developed instruction in the use of chemical literature and has a general interest

in chemical bibliography and in independent research.

Willard has prepared comprehensive mimeographed laboratory manuals for the fundamental courses of quantitative analysis. These have had a number of reissues and revisions. Jointly with Professor N. H. Furman, of Princeton University, he published *Elementary Quantitative Analysis*, a textbook that has appeared in a second edition within two years of the first issue. General and special courses provided by the department offer a broad foundation for research in this field. Particularly helpful to graduate students is the course on physicochemical methods in quantitative analysis. Willard is well known to the profession all over the country for his service in the American Chemical Society as division chairman, member of the Council, director, and associate editor of the *Journal*. In June, 1940, his research papers numbered seventy-four important contributions, of which a number have been done in collaboration with research students. The subjects of them include atomic-weight determinations on silver, lithium, antimony, and chlorine; perchloric and periodic acids and their salts; numerous oxidizing agents; and various physicochemical methods of analysis. Many graduate students are attracted to this field in the Department of Chemistry for work leading to advanced degrees.

The earliest instruction in elementary general chemistry was developed by lectures and quizzes. Laboratory work became possible only after the new Chemistry Building could provide room without detriment to more advanced work. In 1902, when Smeaton came to the laboratory, only a part of the student body in elementary general chemistry could be accommodated in laboratory work. But all discrimination involving special groups of students was obviated

when the present building became available.

The foundation course provides a continuity of work through the year. Courses for special groups of students run for a single semester, and at first these had no laboratory work. Bigelow took over from Freer the responsibility for the foundation course. For many years Lichty handled a special group of students from the College of Dental Surgery and from the School of Pharmacy and occasional students from the two medical schools. Smeaton had a similar group of engineering students; Hale gave instruction in the first semester to a group of students who brought a usable foundation in chemistry from secondary and other preparatory schools. There have been fewer medical and dental students in chemistry classes, as a result of changes in the professional school entrance requirements, but the number of parallel lecture courses has not changed, for enrollments have increased and limitations have been imposed by the need for lecture demonstrations that must be seen by all members of the lecture group. When Hale resigned in 1919 as Associate Professor of General Chemistry, Smeaton was assigned his teaching duties with elementary classes. James Hallett Hodges (Harvard '14, Ph.D. *ibid.* '17) was appointed Instructor in General Chemistry and was placed in charge of the course for engineering students. As Assistant Professor of General and Physical Chemistry he still has responsibility for this course and, in addition, gives advanced lecture courses in physical chemistry. Hodges' research interests lie in the field of actin chemistry.

Bigelow came to the University mainly for the purpose of promoting instruction in physical chemistry. Because his activities were diverted to the administration of the work in general chemistry during Freer's absence, colleagues were

brought to the staff to develop the laboratory instruction and programs of research. Bigelow conducted the fundamental lecture courses in both general and physical chemistry. He has published lecture synopses for elementary general chemistry and a popular textbook, *Theoretical and Physical Chemistry*. His researches have contributed fundamentally to the knowledge of osmotic phenomena. With small groups of students he has directed researches in this field for a number of years. A study of the size of pores in porcelain and of osmotic effects, in collaboration with Floyd Earl Bartell ('08, Ph.D. '10), led to a staff appointment for Dr. Bartell in 1910. Bartell was associated with Smeaton in teaching elementary general chemistry for a few years. When Lind resigned, in 1915, Bartell was placed in charge of physical chemistry laboratory work. He has continued in the laboratory the spirit of research introduced by Professor Hulet and maintained throughout Professor Lind's tenure. He is prominent in the colloid division of the American Chemical Society and has rendered valuable service in organizing national colloid symposia. When readjustments were made in 1923, a newly equipped laboratory for colloid chemistry was established. Here numerous researches are constantly in progress. Bartell's contributions number sixty papers, dealing chiefly with adsorption and the phenomena of wetting.

Richard Chase Tolman (Massachusetts Institute of Technology '03, Ph.D. *ibid.* '10) came to the department as Instructor in Physical Chemistry in 1910. He remained one year and contributed four research papers in that time. One of these, done in collaboration with Alfred Lynn Ferguson ('08, A.M. '09, Ph.D. '15), started the latter in his research career. Ferguson became Instructor in 1915 and is now Associate Professor of

General and Physical Chemistry. He organized a special laboratory for electrochemistry. He has published twenty-six papers in this field and six dealing with problems of education. Numerous important research projects have been developed in this laboratory. One especially deserving mention is that concerned with the redeterminations of fundamental physical constants.

In 1921 Philip Francis Weatherill (Bowdoin '16, Ph.D. Harvard '21) and Lee Owen Case ('20, Ph.D. '27) were added to the staff as instructors. Both are now assistant professors. Weatherill is responsible for lectures in elementary general chemistry. He offers advanced courses in thermodynamics and has charge of laboratory work in physical chemistry. Case also has charge of laboratory work and offers advanced lecture courses. When Professor Lichty was retired in 1932, John Reginald Bates (Amherst '24, Ph.D. Princeton '27) was called to an assistant professorship of physical chemistry. He was advanced to an associate professorship in 1935 and was granted a leave of absence for 1936. Professor Bates developed new lines of research in photosynthesis and directed many original investigations. He has published a number of papers jointly with Leigh C. Anderson and Joseph O. Halford of the staff in organic chemistry.

In 1936 provision was made to give opportunity for research in still another field of modern physicochemical investigation by the appointment of Kasimir Fajans (Ph.D. Heidelberg '09) to a professorship. Formerly, Fajans had held the chair of physical chemistry in the University of Munich, and his *Radioactivity and Latest Developments in the Study of the Chemical Elements*, as well as a text of which he was coauthor, had been published in three languages. He is known among scientists as one of the world's leading teachers and investigators.

Toward the close of Prescott's period of service Gomberg had entire responsibility for teaching organic chemistry in both classroom and laboratory, aided only by a few laboratory assistants. In 1905 Lee Holt Cone (Pomona '01, Ph.D. Michigan '05) became an instructor in the department. Cone became successively an assistant professor and an associate professor. From 1915 to 1917 he gave part-time service to the Dow Chemical Company, and he withdrew from the staff in the latter year. Gomberg and Cone, with laboratory assistants, gave all class and laboratory work in organic chemistry until 1916. In that year three instructors were appointed. Two of them left the service after one year, but Chester Seitz Schoepfle ('14, Sc.D. '18) remained. He succeeded to the positions held by Associate Professor Cone, who left in 1917 and ultimately became Professor of Organic Chemistry and, upon Gomberg's retirement in 1936, Chairman of the Department of Chemistry. Four instructors who received appointments between 1917 and 1921 resigned within one or two years to enter industrial service. Frederick Franklin Blicke ('16, Ph.D. '21), who became Instructor in 1921, was promoted to an assistant professorship in 1925. A year later he was transferred to the College of Pharmacy as Assistant Professor of Pharmaceutical Chemistry, a position that was created especially for him. At the present time he is continuing a program of organic research as Professor of Pharmaceutical Chemistry.

In each of the years 1924, 1925, and 1926 one instructor was added to the staff. All three appointees have remained in the department, and all have received promotions. In the meantime instructors have been obtained on temporary appointments only, as substitutes for regular staff members on leaves of absence.

Leigh Charles Anderson ('21, Ph.D. '24), appointed Instructor in Organic

Chemistry in 1924 and Associate Professor in 1937, had undergraduate and graduate training at the University. He held a teaching fellowship while doing work for the doctorate. Anderson has developed spectrometric research dealing with absorption spectra of organic compounds. Werner Emmanuel Bachmann ('23, Ph.D. '26) had a part of his undergraduate and all his graduate training in the University. Since his appointment to the staff in 1925 he has held a Rockefeller Foundation fellowship for study at the University of Zurich, 1928-29, and a Guggenheim Memorial Foundation fellowship in 1935 for study in England and Germany. He is developing a research field in biochemistry. Anderson and Bachmann are authors of a *Laboratory Manual of Organic Chemistry*. In 1938 Professor Bachmann was named chairman of the division of organic chemistry of the American Chemical Society, and in 1939 he and two other chemists at the University—J. Wayne Cole, Du Pont Postdoctoral Fellow, and Alfred J. Wilds, Teaching Fellow—duplicated in the laboratory the process by which the sex hormone estrone is manufactured by the human body. This was the first time that any human sex hormone had ever been synthetically produced.

Joseph Olney Halford (California '24, Ph.D. *ibid.* '26), who had done his work for the doctorate in physical chemistry, came to the staff in 1926 for the purpose of applying physical chemistry to research problems of organic chemistry. He has developed spectrometric methods in this field.

All members of the department participate in laboratory instruction and share the classwork. Research activities are particularly well co-ordinated. Prescott had established a tradition for intensive research in organic chemistry. When Gomberg succeeded to a professorship in 1904 he had published twenty-eight

original investigations that were recognized in all countries as outstanding contributions. Altogether, his scientific papers number ninety-two, of which some are in collaboration with colleagues. The major investigations have led to the opening of new and varied fields of inquiry, and in following these openings many students have been trained in research under his guidance. Now they are spread over the country in industrial research laboratories and in institutions of higher learning. National recognition has come to him in the awards of the Nichols, Willard Gibbs, and Chandler medals, the national presidency of the American Chemical Society, and membership in the National Academy and in numerous other scientific societies, both at home and abroad. In building up a staff of associates he has shown a rare good judgment in selecting an articulated group

whose members share the teaching and supplement one another in research. Already the four associates now on the staff have contributed almost one hundred original papers. Professor Emeritus Gombert has assurance that the work begun under him will progress much further.

In a *History of the Chemical Laboratory* (1916), Campbell estimated that a total of 746 articles had been published by members of the teaching staff while they were connected with the chemical laboratory. These included papers in medical chemistry, in pharmacy, in chemical engineering, and in pure chemistry. Original contributions to the science of chemistry amounted to 401. From 1916 to 1940 the staff in pure chemistry has added 432 original contributions. Included in the list are a number of epoch-making papers.

WILLIAM G. SMEATON

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THE DEPARTMENT OF ECONOMICS

EARLY HISTORY.—The specialized teaching of political economy began at Michigan pursuant to the following resolution of the Regents, dated April 14, 1880:

That, to provide for the instruction heretofore given by President Angell, Henry Carter Adams . . . be appointed Lecturer upon Political Economy for one semester, at a salary of \$800. (*R.P.*, 1876-81, p. 497.)

President Angell, who had been teaching classes in this subject during one semester and in international law the other half year, had just been granted leave to become United States Minister to China. Adams (Iowa College '74, Ph.D. Johns Hopkins '78, LL.D. *ibid.* '15) continued to teach in Ann Arbor only one semester of each year, the other semester at Cornell, until 1887. Then he was appointed to a full professorship at Michigan, a post he held until his death in 1921.

Instruction in political economy, however, was provided in the University from its very inception. The "Catholopistemiad" scheme, drawn up by Judge Woodward in 1817 (see Part I: **EARLY HISTORY and REGENTS**), proposed a "*didaxia*, or professorship," of "economical sciences" among the twelve subjects of instruction. And, at the Regents' third meeting (June 21, 1837), a resolution was passed "that until otherwise ordained the Professor of Political Economy shall be also Professor of the Ancient and English Languages." Actually, political economy was taught, until President Angell's time, by the current professor of moral and intellectual philosophy, who was nearly always the president of the University or the senior member of the faculty. Thus, the early teachers of political economy were Ten Brook, Tappan, Haven, and Cocker. Indeed, Presi-

dent Haven's chair from 1865 to 1868 was known as the professorship of logic and political economy. As early as 1845 political economy was required during the third term of the senior year in the "Department of Arts and Sciences." In the later fifties President Tappan's growing interest in philosophy pushed economics entirely out of the announcements of courses, but it reappeared as an elective study in Haven's administration and was made a prominent part of the curriculum by President Angell.

A few further details may be gleaned from the annual catalogues—all with reference to the liberal arts department or college. In 1843-44, for example, seniors apparently were required, during the last term, to study Wayland's *Political Economy*. Similar announcements recurred for more than a decade, except that this subject was sometimes taught in the junior year; in 1850-51 Wayland's text was still used. Juniors of 1852-53, in both classical and scientific courses, were instructed in economics "by the use of text books, accompanied with lectures and by references to the standard works on political economy. The students are here also required to read original essays on subjects connected with the course" (*Cat.*, 1852-53, p. 30).

President Angell, in his first year at Ann Arbor, reported to the Regents:

We should have also, at an early day, a Professor to give instruction in Political Economy, Political Philosophy, and International Law. The very brief course in Political Economy has been conducted by the Professor of Moral and Intellectual Philosophy [Cocker], who would prefer to confine himself to his own special work, and it has not been offered at all to the classical students. I have this year given twenty familiar lectures on International Law to about two-

thirds of the senior class. But provision should be made by which every student should be able to take a generous course in the Political Sciences. (*P.R.*, 1871-72, p. 16.)

Dr. Angell proceeded in the following years to develop such courses himself, teaching political economy one semester, international law the other. By 1879-80, the year before Adams came here, Angell was responsible for three classes in economics: two sections of an elementary course and one in "advanced political economy"—all meeting twice a week.

BUILDINGS AND SPECIAL FACILITIES.—The first acquisition of special facilities for political economy was announced through the *University Calendar* (1871-72, p. 10) in the first year of Dr. Angell's presidency:

The University Library contains about twenty-two thousand volumes. During the past year it has been enlarged by the addition of the library of the late Prof. [Karl Heinrich] RAU, the distinguished Professor of Political Economy in the University of Heidelberg, Germany . . . purchased and presented to the University by PHILIP PARSONS, ESQ., of Detroit. It contains about four thousand volumes and from two thousand to three thousand pamphlets. It is especially rich in European works on the Science of Government, Statistics, Political Economy, and cognate subjects.

Adams' earliest activities at Ann Arbor were naturally carried on in University Hall, which was then relatively new. Soon after Tappan Hall was built (in 1894), Adams and his colleague Taylor were transferred there. The department's work developed in Tappan Hall until about 1910, when the south part of the old Chemistry Building became designated as the Economics Building. This building has been so patched over from time to time that now only its numerous chimneys suggest its former uses. The larger lecture rooms are still fitted with shades and screens for lantern projec-

tions, which have not been used for many years. The northern parts of the whole structure (first used in 1857), now known as the Pharmacology Building, usually harbor some animals used for experimental purposes. Also, an additional large basement room was equipped before 1920 as an accounting laboratory, with desk-tables and adding machines. It is overcrowded, and has been for some years, by the large classes in that subject.

Another large room on the second floor became the departmental library about 1914. When Angell Hall was completed, in 1924, the economics and mathematics libraries were combined on its third floor, and the room thus vacated in the Economics Building has served as a statistical laboratory as well as a general classroom. For some years, in the time of Adams and Taylor, virtually all book accessions in economics and sociology were purchased directly by the department for the economics library; since the middle 1920's most single copies of economics literature have gone into the General Library, and additions to the economics reading room are mainly multiple copies for the larger classes. In 1912 the department collected some thirty-one photographs and prints of leading economists. If funds for the purpose become available, this collection may be extended and suitably displayed.

PERSONS AND POLICIES; PROGRAMS OF UNDERGRADUATE STUDIES.—The most obvious divisions of the department's history are the terms of the three administrative heads—Adams (1880-1921), Day (1923-27), and Sharfman (since 1927).

In Adams' term several significant phases may be discerned, each phase lasting approximately a decade. For about twelve years after he began lecturing here, Adams conducted the teaching in economics almost single-handed, and until 1887 during only one-half of the year. In 1892 Fred M. Taylor

joined him, and soon thereafter Charles H. Cooley became a full-time instructor and began to give courses in sociology. The third decade of Adams' regime saw the establishment of new courses in industry and commerce and in public control of railways and other industries, taught in part by Edward D. Jones and Harrison S. Smalley. In the fourth decade (after 1912), public control of industry was further developed by I. L. Sharfman, and in this period students, teachers, and courses in business administration and sociology all became more numerous. The School of Business Administration (see Part VI: SCHOOL OF BUSINESS ADMINISTRATION) was created in 1924, three years after Adams' death. The Dean of the new school, Edmund E. Day, continued to be Chairman of the Department of Economics in the College of Literature, Science, and the Arts until his resignation from the University in 1927, since which year the School and the department have been headed respectively by Dean Griffin and Professor Sharfman. The group teaching sociology (see Part IV: DEPARTMENT OF SOCIOLOGY) remained administratively a wing of the Department of Economics until 1931, two years after Cooley's death; and a year or two later sociology offices and classes were removed to the old Law Building (Haven Hall).

The roster of persons who have taught economics and business in the Department of Economics (or Political Economy), from the beginning of such instruction at the University through the year 1939-40, includes 183 names. This count excludes eight nonresident lecturers in political economy, also Cooley and other sociologists, and appointees in the School of Business Administration in 1924 and later years. Classified by highest rank attained up to 1940, this roster includes eighteen full professors, four visiting professors, six associate pro-

fessors, fourteen assistant professors, seven lecturers, ninety-four instructors, and forty teaching fellows.

Henry Carter Adams, 1880-1921.—Adams was called to Michigan in 1880, as stated above, to take over President Angell's one-semester offerings in political economy. Within a few years, under the stimulus of the School of Political Science (see Part IV: DEPARTMENT OF POLITICAL SCIENCE), various other courses were announced under the heading "Political Economy." These announcements signify the beginnings of Adams' instruction at the University of Michigan in public finance and industrial history, and they also show how early he developed alliances with other departments and with people and organizations outside the University. For 1882-83, for example, the following courses were announced in connection with the economics offering: Public Scientific Surveys, Relations of Government to Scientific Progress; and Economic Development of Mineral Resources. These two courses were taught respectively by the professors of geology and of mineralogy and mining engineering.

During the first year of his full professorship here (1887-88) Adams introduced a course designated Principles of the Science of Statistics. At about the same time he became chief statistician for the Interstate Commerce Commission, which post he held until 1912. In this period also appeared germs of other types of instruction which grew to great importance—notably advanced economic theory, international trade, and social and industrial reform. The classes had already attained such size that Adams was allowed an assistant. This assistant, Frederick C. Hicks ('86, Ph.D. '90), later president of the University of Cincinnati, became Instructor in Economics in 1890-91. During the latter academic year Adams was absent, doing work with

the Interstate Commerce Commission, and his place was temporarily filled by Fred Manville Taylor (Northwestern '76, Ph.D. Michigan '88), who was then teaching history and political economy at Albion College.

By 1892, the year when Taylor came here permanently as Assistant Professor of Political Economy and Finance, ten courses in political economy were announced for each semester—"classified," according to the *Calendar* of 1892-93, "as undergraduate, intermediate, and graduate courses." Frank Haigh Dixon ('92, Ph.D. '95), later Professor of Economics at Dartmouth and at Princeton, assisted Adams in his course (for which five sections were listed) on industrial history; and Charles Horton Cooley ('87, Ph.D. '94) taught Theory of Statistics and History of Political Economy, as well as an elementary course in economics. Taylor was giving two or three one- or two-hour courses each semester in currency and banking, American industrial history, agrarian, socialist, and communist movements, and social philosophy with reference to economic relations, and he was also assisting Adams in a course announced as Problems in Political Economy. The problems studied, according to the *Calendar*, were "the railroad problem; industrial crises; free trade and protection; industrial reforms; labor legislation; taxation." Taylor, moreover, was already launched on his own introductory course in principles (Elements of Political Economy—three lectures a week and one quiz hour for each of the four sections). The four teachers collaborated, each semester, in a weekly two-hour seminar, Current Economic Legislation and Literature.

This 1892-93 offering was typical of its decade, except that within a few years Cooley was beginning his career in sociology, and Taylor took over the history of political economy. The *Calendar* for

1888-89 had announced a seminar "designed for candidates for advanced degrees," and in 1895-96 Adams, Taylor, and Cooley were listed for a course of three credit hours on "critical studies in economics and sociology, intended especially for graduate students but open to seniors specializing in political economy, who satisfy their instructors of their fitness for the work."

Not until 1910 did the curriculums in business administration, which developed into a separate School in 1924 (see Part VI: SCHOOL OF BUSINESS ADMINISTRATION), become as prominent as economics and sociology were in the departmental announcements; but the year 1901 was marked by two significant appointments—those of Edward David Jones (Ohio Wesleyan '92, Ph.D. Wisconsin '95) as Assistant Professor of Commerce and Industry and of Durand William Springer (Albion '86, A.M. Michigan '24) as Lecturer on Accounts. The *Calendar* of that year refers to "those who wish to combine the study of political economy and finance with history, political science, and law for the purpose of preparing themselves for some one of the several professions or careers to which this group of studies naturally leads." (This is reminiscent of the similar aims of the School of Political Science about twenty years earlier.) And, in the *Calendar* for 1902-3, the following paragraph first appeared:

Industry and Commerce. The courses in industry and commerce have for their special object the study of organization and processes of modern business. They are closely related to economics, both as a study of wealth production and as an account of economic principles in industrial society. Some of them are technical in character and are intended to rank as semi-professional courses.

In the new courses which Jones taught relating to industrial development and organization appeared professors from

the Departments of Geology and of Law. There was also a revival of nonresident lectureships, one of them "on the industrial significance of ship canals."

The teachings of Adams in governmental control of railways and of other industries were supplemented, at first by those of Harrison Standish Smalley ('00, Ph.D. '03), who in 1903 was appointed Instructor in Political Economy. In the year of Smalley's death (1912) the services of Isaiah Leo Sharfman (Harvard '07, LL.B. *ibid.* '10) in the University were begun. Sharfman, who advanced to a full professorship in 1914 and has been Chairman of the Department of Economics since 1927, applied his training in law and his experience in teaching and research to the elaboration of courses on corporations, railways, and public utilities, from the standpoint of public policy and social control.

Edmund Ezra Day, 1923-27.—Edmund E. Day (Dartmouth '05, Ph.D. Harvard '09, LL.D. Vermont '31), who left Michigan in 1927 to join the Rockefeller Foundation and is now president of Cornell University, began his teaching and chairmanship here in February, 1923. The total enrollment in the department had been growing very rapidly, as will be shown below. This growth, and the difficulty of even maintaining the upper staff during Adams' last illness and the interregnum, had thrown the teaching of the numerous students in economics, sociology, and business administration into the hands of less than a dozen men of professorial rank, assisted by a crew of instructors working toward their doctor's degrees. Day was enabled to enlarge the upper staff and to set up a professional school of business administration, including its Bureau of Business Research, which has been of assistance in some economic studies and publications. (The teachers of sociology already had practical autonomy, though they were formally

within the Department of Economics until 1931.) From Day's time also dates continuous existence of the present Economics Club, which arranges evening meetings at irregular intervals, where faculty members and graduate students of economics and business administration present findings from their researches and have discussions with visiting scholars in these fields.

Soon after his advent, Day urged upon the faculty of the College of Literature, Science, and the Arts the development of a scheme of majors or concentration, to be part of the requirements for the bachelor's degree. (This College at the University of Michigan was one of the last academic strongholds of the "free elective system.") His committee's plan was rejected, but within a few years (1931) another committee secured adoption of the present concentration plan.

Isaiah Leo Sharfman, 1927 to date.—In the department's latest decade, enrollments have continued to grow, and the undergraduate concentration program has received increasing attention.

ENROLLMENTS.—In the academic year 1912-13, when available records were begun (Professor Sharfman soon thereafter became Secretary of the Department), there were 793 enrollments in introductory courses, 822 in more advanced economics, 434 in business administration, and 457 in sociology; a total of 2,506 student class-members within the department, averaging some 1,250 each semester. By 1916-17 the corresponding total for both semesters had grown to 4,426. The war reduced this index to 2,834 in 1918-19; then came a deluge of 6,712 enrollments (elections) in 1919-20 and still more (7,626) in 1920-21. Thus, in the autumn of 1920 Taylor had the task of organizing instruction of more than 1,000 students in his introductory course; and great upswings had occurred in all the other categories of courses in the depart-

ment. This heavy tide subsided somewhat within a few years. Elections in courses then in the department but now given in the School of Business Administration reached their peak of 1,891 in 1921-22; while elections in sociology rose to nearly 2,100 just before the separate Department of Sociology was organized (1931). The total elections in elementary and advanced economics courses remained close to 3,000 from 1925 to 1929, fluctuated near 3,300 until 1934, and between 1937 and 1940 have run above 4,700. This last rise is attributable in part to new requirements and recommendations in various curriculums of the College of Engineering. Already in 1912-13 there were 141 elections in special economics courses for students in other colleges, and nowadays the similar courses draw more than 700 elections a year. The introductory courses in accounting (with several hundreds of elections each year) and some advanced work in this field have remained in this department and are patronized in part by students working toward degrees in engineering and law, as well as by those contemplating business and other professional degrees.

Further analysis of trends within the introductory courses shows that the largest number of enrollments in the introductory courses is always in the two semesters of the year's work on the sophomore level, which serve as a foundation for the more advanced courses in the department. Before 1921 there was only one full semester (four or five hours credit) of elementary principles. At one time, at least (1909-10), six weeks of the second-semester course were devoted to "distribution" theory, the remainder to "problems." Since 1921 the year's introductory work—usually for three hours' credit each semester (one lecture and two or three quiz meetings a week)—has been organized with reference to a framework of principles. Another course

provides an introductory survey of economics through one semester for seniors and graduate students whose main interests lie elsewhere.

The percentage of D and E grades in all the department's courses (including business administration and sociology) in 1912-13 was slightly lower than the corresponding percentage in other courses in the College of Literature, Science, and the Arts, but by 1924 the percentage of D's and E's in economics courses had risen well above the general level for the College, though no economics courses have been open to freshmen.

CONCENTRATION.—The foregoing survey of trends in course elections leads to a historical view of specialization in economics and allied subjects in the College of Literature, Science, and the Arts. For some years before the business and sociology courses were split off there were curriculums within this College leading to certificates in business administration and in social work (with the bachelor's degree; see Part IV: DEPARTMENT OF SOCIOLOGY). Since 1924 the former of these has been supplanted, in part, by the combined curriculum in letters and business administration—a five-year course, open only to students with a B— or better average of scholarship. This group of students, in their junior year, is supervised by the Department of Economics, which, since the concentration plan of the College of Literature, Science, and the Arts became effective, has also been responsible for upperclassmen concentrating in economics.

Table I shows that usually 10 per cent or more of the juniors and seniors in this College not enrolled in the combined curriculums are specializing in economics. Actually, for most years, this has been the largest single group. The table also shows numbers of juniors, each autumn semester, in the combined letters and business administration curriculum. Avail-

TABLE I
UPPERCLASSMEN IN THE COLLEGE OF LITERATURE, SCIENCE, AND THE ARTS SPECIALIZING
IN ECONOMICS AND BUSINESS

FIRST SEMESTER OF ACADEMIC YEAR	JUNIORS IN COMBINED CURRICU- LUM IN LETTERS AND BUSINESS ADMINISTRATION	JUNIOR AND SENIOR CONCENTRATORS		
		In Economics	In the College	Per Cent in Economics
1933-34	40	53	.....	....
1934-35	54	140	.....	....
1935-36	45	166	1,576	10.5
1936-37	52	196	1,670	11.7
1937-38	33	269	1,711	15.1
1938-39	27	279	1,761	15.8
1939-40	41	207	1,870	11.0

ability of this type of combination (in letters and law also, for example) enables the better students to expedite their academic work, and it also distorts, somewhat, statistical comparisons as to numbers and abilities of concentrating groups at the University of Michigan and elsewhere. (At Harvard College, for instance, where concentration has been required over a much longer period and where there are no combined curriculums for undergraduates, about 16 to 17 per cent of all concentrators, in the decade 1926-36, were in economics.)

A survey was made several years ago which traced the students who made B or better in the elementary economics courses, Economics 51 and 52, in 1932-33 and 1933-34, to ascertain their later fields of specialization. The largest percentages (26.3 for 1932-33 and 19.6 for 1933-34) went into the combined curriculum in letters and law. Corresponding percentages of these superior students were, for the same years: concentrating in economics, 13.2 per cent and 17.6 per cent; entering the letters and business administration curriculum, 21.2 per cent and 7.8 per cent. These three fields together, therefore, appear to attract about half of the students who show most aptitude in the earlier economic studies.

The full-year course in economic principles, available in the sophomore year, is required before entrance upon the economics concentration program in the junior year is permitted. As an upper-classman this concentrator must take not less than twenty-four nor more than thirty-four hours of credit in economics courses, including a course in accounting or statistics and sequences of two and three courses respectively in two other economic fields—such as theory, money and credit, labor, public control of industry, international economic relations, economic history, and public finance. Certain courses in advanced economic theory are counted in any of the other sequences.

GRADUATE PROGRAM.—Graduate studies have long been highly important in the program of the Department of Economics.

The count of higher degrees in economics appears to begin with the doctor of philosophy degree awarded in 1890 to Frederick C. Hicks, whose dissertation was entitled "The Foreign Trade of the United States." In the decade ending in 1900, twelve master's and seven doctor's degrees were awarded in this field—among the latter being the doctorate of Charles Horton Cooley ("A Theory of Transportation"). From 1900 to 1910,

advanced degrees continued to be few—ten master's, seven doctor's. After 1910 the pace quickened. In the next three decades (ending in 1920, 1930, and 1940) the numbers of master's degrees awarded in economics were, respectively, 34, 87, and 159; and of doctor's, 7, 19, and 24. The total, 1889 to 1940, is 302 master's, 65 doctor's.

The preceding data are believed to be accurate for the period since 1910, but for the earlier years it is not always possible to classify advanced degrees according to field of specialization. Fred M. Taylor, for example, received this University's doctor of philosophy degree in 1888, his dissertation being entitled "The Right of the State to Be." His graduate study appears to have been more largely in philosophy and politics than in political economy; his degree therefore is not included in the above count. For three decades after doctorates in economics began to be given here, the subjects of dissertations were usually in Adams' fields, transportation and public finance, or in Taylor's fields, money and general theory. Several types of master's degrees were formerly given in political economy (masters of arts, of philosophy, of laws, and of science; see Part II: DEGREES).

Thoroughly capable graduate students with previous training in economics have usually been able to earn the master's degree in about one academic year and the doctor's degree in perhaps three or four years of full-time work (beyond the bachelor's degree). When the School of Business Administration was organized in 1924, it provided for the master's degree in business administration, based upon two years of study in a specialized and largely prescribed curriculum additional to four years of undergraduate work, except (as noted above) for students in the combined letters and business administration curriculum. More

recently programs leading to the degree of doctor of philosophy in business administration have been established in the Graduate School.

Questioning has been heard for some time, in the field of economics as elsewhere, as to what trends should be favored with reference to the master's degree. The increasing disposition of state and local educational authorities to put a premium on the possession of this degree by high school teachers is, of course, an important part of the general story; but this particular demand has not affected the Department of Economics as much as it has affected many other departments, inasmuch as there has been little demand for high-school teachers offering economics as their major subject. No quantitative studies are available to show the statistical distribution of holders of the master's degree in economics by occupations and employers, but most of them who do not pursue studies further toward the doctorate appear to find employment readily, notably in secondary teaching of commercial and social studies, in college and university teaching, and in government and business. In addition to the requirements for undergraduate concentration mentioned above, candidates for the master's degree are required to do a year's work in advanced economic theory and to write at least one substantial paper, normally in a research seminar.

A somewhat special problem has been presented to the University of Michigan by rather large numbers of graduates of foreign universities seeking advanced degrees. Our list shows that between 1890 and 1902, out of ten persons who received the degree of doctor of philosophy in economics, three bore Japanese names. Since the latter of those dates only one Chinese and one Japanese have earned the doctor of philosophy degree in this department, and from 1902 until 1916

no Oriental names appeared anywhere in the department's lists of higher degrees. After 1916 they occurred with increasing frequency. Of the ninety-nine recipients of the master's degree from 1930 to 1936, no less than twenty-six were Orientals—mostly Chinese. Naturally these Oriental students usually have to work here longer than do American college graduates to earn the master's degree, and a number of them leave without completing the work for it. Variations in studies and standards among the foreign colleges, of course, are still greater than among the numerous American institutions from which we draw graduate students, and such wide differences in background have thus far made it seem inadvisable to require a more nearly uniform curriculum for the degree of master of arts in economics.

In Adams' time there was no general reckoning between the faculty and the doctoral candidate until, his course and language requirements fulfilled and his dissertation accepted, he stood a long oral examination in which emphasis was placed on the dissertation, the special field, and general economic theory. Candidates were accustomed to prepare themselves in the field of theory by long attendance in Taylor's advanced courses, which treated new examples of theoretical literature every year.

Within a year after Edmund E. Day came, in February, 1923, the requirements for the degree of doctor of philosophy were modified into a system much like that which prevails at present (1939-40). Before he is well launched on his dissertation, the candidate must now take a preliminary general examination, the major part of which consists of four three-hour written examinations in fields selected by himself out of the principal divisions of economics, always including economic theory and its history. And before these examinations may be written,

various preliminaries must be completed, notably foreign-language tests, courses in eight specified economics fields, and preparation in some cognate field. The general examination ends with an oral conference. When these hurdles are cleared, the candidate devotes himself to his dissertation; and after the latter is accepted, he must stand an oral examination on it and his special field.

FINANCIAL AID.—An important factor in graduate studies everywhere is financial aid to students. A majority of those who have taken the doctorate in this department have been at some stage quizmasters in the elementary courses—a condition which is perhaps normal among the American universities. Frederick C. Hicks, for example, began quizzing for Professor Adams within a year or two after the latter became a full-time member of the faculty, and Hicks earned his doctor's degree in 1890. By 1895 Charles H. Cooley and Frank H. Dixon had secured doctorates in economics in similar fashion. Such predoctoral instructors in many cases were paid on a full-time teaching basis. In recent years the University's policy has been modified, so that persons without the doctorate or equivalent attainments are no longer acceptable for the title "instructor." Graduate student quizmasters are still employed in the economics and other departments, but they are now designated as teaching fellows, and they receive stipends based upon less than full-time service.

Graduate study in economics at the University of Michigan has also been assisted by other fellowships and scholarships. Adams, for example, secured gifts from Messrs. Frank H. Hecker and Joseph Boyer of Detroit, in 1913 and 1914, aggregating \$2,500, which funds were employed primarily for the support of two fellows in transportation for two years or more. Probably these fellows

had some instructional duties. For some years of late, moreover, the State College fellowships, administered by the Graduate School, have brought alumni and alumnae from Michigan colleges to the department at the rate of one or more almost every year. Other aids for graduate students include or have included the University fellowships and scholarships, the Michigan-Brookings fellowship, maintained jointly by the University and the Brookings Institution at Washington, D.C., the Earhart fellowships and scholarships (see Part IV: DEPARTMENT OF SOCIOLOGY), the Rackham fellowships, and the Taylor fellowship, for which funds are accumulating as mentioned below.

RESEARCH AND PUBLICATIONS.—Adams was a pioneer among American economists in the development of syllabi and texts in various political economy courses. The General Library contains, for example, his *Outline of Lectures on Political Economy* (seventy-six pages, dated 1881), used for instruction at Johns Hopkins, Cornell, and the University of Michigan. And in Adams' private library is a volume of mimeographed lectures on "The Labor Problem" and other subjects, used in a course which he gave in the Department of Law in the early nineties. By 1902-3 Taylor's lectures on "Elements of Political Economy" were sold in mimeographed form by Edwards Brothers, Ann Arbor. Taylor's *Chapters on Money*—a preliminary textbook for his students—appeared in 1906, and his source book, *Some Readings in Economics*, in 1907.

About 1915 the following passage appeared in the Preface to the third edition of Taylor's *Principles*:

In view of the increased expense to the students due to the frequency of new editions, I shall permit myself to explain that this text, like Professor [Walton H.] Hamilton's Readings, Professor [George W.] Dowrie's

Syllabus, and other books or pamphlets published by the University for the use of the classes in Economics, brings no pecuniary profit to the instructor immediately concerned or to the University. Any surplus which may emerge is to go into a departmental Printing Fund to be used for the revision and expansion of these texts and for the printing of other class helps.

The printing fund derived from the sale of these texts was drawn upon as indicated, notably for the syllabus used by advanced theory classes, which went through four editions and was distributed gratis to the students. After Taylor's retirement in 1929, the Regents set aside the \$3,638.88 remaining in the fund to accumulate for a fellowship in his memory.

The works just referred to were textbooks, though they embodied a great deal of scholarly research. Taylor's *Principles*, for example, was prepared and used as an elementary text; it is nevertheless a profound work in economic theory. Similar observations might be made concerning other texts prepared by Michigan teachers, such as Adams' *Science of Finance*.

Rather comprehensive compilations have been made of publications of present and past members of the teaching staff, but it would be impossible to cite precisely even the chief publications of scholarly work done in the Department of Economics. The works of Charles H. Cooley, for instance, are much more relevant to the origins of the Department of Sociology; yet most of them came to fruition while he and his group were closely associated with the economics staff. In some degree a parallel comment would apply to the writings of some teachers in the School of Business Administration, such as Day's *Statistical Analysis*, Griffin's *Foreign Trade*, and Rodkey's *Banking Process*. Jones's *Administration of Industrial Enterprises* was

a pioneering, widely influential manual on general principles and practices in business organization; its author resigned from this department and University in 1918, six years before the School of Business Administration was established. Friday's *Wages, Prices, and Profits* appeared near the end of this economist's work in Ann Arbor. Some books, such as Goodrich's *The Miner's Freedom*, Remer's *Foreign Investments in China*, and Hoover's *Location Theory and the Shoe and Leather Industries*, were published after the authors had joined the staff but had been partly prepared previously; others, like Van Sickle's *Direct Taxation in Austria* and Ellis' *Exchange Control*, were largely prepared during the authors' connection with the department, but appeared later. Remer's *Chinese Boycotts*, Ellis' *German Monetary Theory*, and Dickinson's *Compensating Industrial Effort* are examples of work carried through to publication during the authors' teaching here. Associate Professor Robert S. Ford has been senior author of several of the *Michigan Governmental Studies*, issued by the University's Bureau of Government, of which he has been Director since 1938 (see Part VI: BUREAU OF GOVERNMENT).

An important type of scholarship, of course, grows out of doctoral dissertations. Among publications arising out of dissertations in economics accepted by this University may be cited Paton's *Accounting Theory*, Dewey's *Long and Short Haul Principle of Rate Regulation*, Yang's *Good Will and Other Intangibles*, and significant articles by Shorey Peterson on economic problems of highway transport. Three of our dissertations have secured publication in full through winning national prize competitions—Watkins' *Bankers' Balances*, Seltzer's *Financial History of the American Automobile Industry*, and Nelson Lee Smith's *Fair Rate of Return in Public Utility Reg-*

ulation. No funds have been provided here for subsidizing publication of researches in economics as such, but the monographs and dissertations published by our University's Bureau of Business Research (see Part VI: SCHOOL OF BUSINESS ADMINISTRATION) have included several works by members of the economics teaching staff and several dissertations for the doctor of philosophy degree in economics. Economics dissertations thus published, in whole or in part, are those of Wyngarden, Taggart, Phelps, Waterman, Woodworth, and Daniels.

The foregoing retrospect may be supplemented by an attempt to indicate further the significance of the events recounted, with special reference to the structure founded by Adams and Taylor. The interests and abilities of these men, although not always completely harmonious, interacted to produce substantial intellectual achievements and to develop the abilities of many able students and colleagues.

Taylor wrote, shortly before his death, in response to an inquiry from Professor F. A. Hayek (of the London School of Economics, and formerly of Vienna):

.... I greatly appreciated your kind comments on my *Principles*. As my very limited working capacity made it quite certain that I should do relatively little writing, I early determined to limit myself to doing one or two things and doing them as well as I could. My particular capacities and tastes, added to earlier training in philosophy, made it natural for me, as a teacher of Economics, to devote myself to *theory*, with only so much attention to the concrete as was necessary to furnish the background for theoretic analysis.

Actually, he did not limit himself so narrowly as is here suggested, in his earlier years, for he labored assiduously in the field of money, banking, and currency. In this province, through his teaching

and publications, he was a national intellectual leader by the beginning of the present century. He later became absorbed in problems concerning the elementary course in economic principles and advanced instruction in economic theory. His theoretical publications are based upon somewhat narrow and designedly abstract premises. Although he was always much interested in history and belles-lettres—subjects which he taught at Albion College—he made natural science texts his model for his economic writings, deliberately forswearing literary graces of exposition and making much use of italicized “principles” and “corollaries” as well as of numerical problems. His classroom cabinets stuffed with blueprint charts remain in our buildings as relics, as do a few dictaphone cylinders containing his dictation. The quality of Taylor’s theory slowly obtained widespread recognition, as his disciples spread over wider fields, but in reference to his pedagogical methods (especially as applied to the general run of students in elementary principles) many contemporary observers would agree with the following remark in a private letter from a former colleague:

The defect of the elementary course under Professor Taylor was that it was a course in theory and an exercise in logic, rather than instruction in the practice of the scientific method of determining premises. The result was to make young students who had been exercised in the artificially simplified cases used in the course unduly sure of themselves.

Taylor, however, fully recognized this danger, and uttered many warnings. In his second mimeographed lecture of 1902–3, for instance, appears the following passage, typical of the caveats he was wont to give out:

Doubtless if I would ask you what was your purpose in studying Political Economy many of you would say that you wished to be prepared to have an opinion on certain

questions before the country and that you would like to be able to discuss them intelligently if the occasion arose; and others that they intended to pursue political careers. THE RIGID APPLICATION OF PRINCIPLES TO PRACTICAL CASES IS EXTREMELY DANGEROUS, AND IS APT TO BE A MISTAKEN APPLICATION IN NINE CASES OUT OF TEN [capitals in original].

This teacher was also a lifelong student of socialist literature, and his surviving writings are full of penetrating discussions of its problems. The “Critique of the Existing System,” with which his *Principles* ends, is distinctly conservative in tone and indicates the general position which he always held. His last publication—an address as president of the American Economic Association in 1928—on “Guidance of Production in a Socialist State” is now cited approvingly by both socialist and nonsocialist economists. This publication amply testifies to the persistence of his interest in these theoretical issues; but it is clear that he was never optimistic as to the immediate practical possibilities of economic collectivism.

The department’s present courses in elementary economics, money and credit, and social reform are still influenced by Taylor, in that the teachers in charge were his students or colleagues, or both. His favorite field of economic theory, since his retirement, has been divided and cultivated simultaneously by a number of successors, of whom Ellis, Peterson, and Dickinson were for some years personally associated with Taylor.

Different in many ways were the genius and development of Adams. While on the threshold of his career, he boldly jeopardized his worldly prospects by defending labor unions, collective bargaining, and liberal principles in general. Later, his preoccupation with work outside Ann Arbor, especially at Washington, was occasionally considered rather

excessive by a few of his Ann Arbor associates; but these labors nevertheless enriched his teaching. He will long be remembered for his work in the field of government finance; other studies which he persistently carried on form a complex composed of principles and administration of transportation, accounting, statistics, and public regulation of industry. Judge Cooley selected Adams to be chief statistician of the Interstate Commerce Commission, not merely because he was Cooley's colleague in Ann Arbor, but because the younger man had already given such convincing evidences of his fitness as may be found in his classical paper of 1887, *The Relation of the State to Industrial Action*.

By 1906 statistical reports under oath from the railways to the Interstate Commerce Commission, based on a standard accounting system approved by the Commission, were made mandatory by federal legislation. Adams assisted the railway officials to work out such a system, and later (in 1913) he spent a year in China as special adviser to the Chinese government on railway accounts. These experiences and responsibilities were reflected not only in the courses in railway and transportation problems and in public control of business—which courses were given in both the Department of Literature, Science, and the Arts and in the Law Department—but also in the proliferation of instruction after 1909 in railway organization, operation, and finance. The Hecker and Boyer gifts, referred to above, belong to this epoch; part of the money was used to buy books

on transportation for the General Library. Perhaps the most significant innovation of the period was a course in the year 1909-10, entitled *Railway Statistics and Accounts*. This course is symbolic of the great constructive achievements of Adams and his school toward basing governmental regulation of industry on that foundation which is now generally realized to be quite indispensable—regular statistical reports, made possible by standardized accounting. In this manner and in other ways the Michigan economist developed practical means which the state may use in its efforts to safeguard industry from shortsighted and antisocial actions.

Adams' work has been carried forward in the department, especially by the two present members of the staff who were his colleagues during his later years—Sharfman (assisted by Shorey Peterson) and Paton. The latter is distinguished both as an accountant and as an economist; his many publications include several texts in accounting, a research monograph on *Corporate Profits as Shown by Audit Reports*, and his major contributions to the *Accountant's Handbook*, of which he is editor. Sharfman, whose teaching and other public service have dealt especially with government regulation of transportation and other public utilities, in Adams' time published *Railroad Regulation and The American Railway Problem*; and the year 1937 saw publication of the fifth and final volume of his authoritative *Interstate Commerce Commission*.

Z. CLARK DICKINSON

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THE DEPARTMENT OF ENGLISH LANGUAGE AND LITERATURE

THE Department of English Language and Literature, like most college departments, came into existence not by special creation, but by a process of evolution. The earliest program of courses, that for the academic year 1843-44, provided for work in rhetoric, but only in connection with a formidable curriculum in the Greek and Latin languages and literatures. The story of rhetoric's uncertain and shifting attachments and its later history as a department (between 1903 and 1930), before its definite union with English, are told in a separate article (see Part III: DEPARTMENT OF RHETORIC).

It is true that even in the 1830's the teaching of English existed as one of the fainter hopes entertained by the Regents. A resolution offered on June 21, 1837, and tabled on the same day, provided that "until otherwise ordained the Professor of Political Economy shall be also Professor of the Ancient and English Languages." But no professor of political economy was appointed; and it was not until 1841 that instruction in any subject was given.

The first mention of English literature appeared in the *University Catalogue* for 1852-53, the first year of President Tappan's administration. It was Tappan's policy, however, to publish hopes as well as promises; he believed, no doubt, that publication might make the hopes come true—as, in the long run, many of them did. A professorship of rhetoric and Eng-

lish literature was announced, but no professor was named, and none was appointed. In the scientific course newly added to the classical course, and leading to the bachelor of science degree, work in English language and literature was prescribed for the first and second terms of the freshman year. In the departmental announcement, it was said that "the Professor of Ancient and Modern Languages, and the Professor of Intellectual and Moral Philosophy" would "take charge of this branch, jointly."

These professors presumably held themselves ready to take charge also of the work in English language and literature in the proposed "university course" of postgraduate studies. But, as it is said in the Hinsdale-Demmon *History of the University of Michigan* (p. 87):

It is not now easy to get at the precise facts relative to the graduate work that was really done previous to 1878. In the first place we do not know how many of the so-called Graduate Courses were ever given; no doubt, however, it was a minority.

Advanced work in English must have belonged to the weak majority; for before 1860 English language and literature, as well as rhetoric and criticism, had disappeared from the "Programme of studies for the degrees of M.A. and M.S."

In the meantime, however, English had gained the part-time services of a professor. Dr. Haven, who was to return to the faculty later as President, received his first appointment in 1852 as Professor

of the Latin Language and Literature; but two years later, having given over this professorship to Henry Simmons Frieze, he became Professor of History and English Literature. In 1856 he resigned. But when in 1863 he returned as President he served as Professor of Rhetoric and English Literature.

For some time even the study of English literature was rhetorical in its main purpose. The *Catalogue* for 1854-55 stated: "The survey of our general Literature is necessarily cursory, and is designed chiefly to establish fundamental principles of criticism, and to cultivate correctness and propriety of style." This seems to carry on the policy announced in the *Catalogue* for 1852-53 for the study of Greek and Latin: that is, to give the student "knowledge . . . of those rhetorical principles which will enable a person to express his thoughts in idiomatic and perspicuous English. In this department, therefore, nearly as much attention is paid to the study of English as to the study of Greek and Latin." Nevertheless, the change in 1854-55 is important: the student is now to be taught the use of English not only from classical but also from English models.

In 1856-57, the year after Professor Haven resigned, only rhetoric appears to have survived, and that only as taught by an instructor who also had to teach Greek. In the following year, however, the professorship of history and English literature was filled by the appointment to the faculty of a man who was to become one of its most distinguished members, Andrew Dickson White (Yale '53, A.M. *ibid.* '56, LL.D. Michigan '67), later best known as minister to Russia, ambassador to Germany, and president of Cornell University. Together with Datus C. Brooks ('56, A.M. '59), Assistant Professor of Rhetoric and English Literature, he brought renewed importance to the study of the English lan-

guage and literature. This study was still limited to "members of the Scientific Department." And, as the following statement shows, its purpose was still largely rhetorical: "The object of this plan is to secure an examination of the principles of our native tongue." By the year 1858-59, work in English literature had been extended for the second semester of the second year to the classical as well as to the scientific curriculum. An added object of the study is indicated in the promise of "criticism of the Masterpieces of our Literature." And Assistant Professor Brooks could hardly have avoided getting into literary history in his course: "English Language and Literature, particularly during the Anglo-Saxon and Anglo-Norman Periods, and the Age of Elizabeth." There is no evidence in the catalogues, however, that expansion had gone so far as to include graduate work in English. The activity of the undergraduate students, not only in rhetoric but in the English language and literature, seems to have been largely in original compositions and declamations; and "during the last two years the pieces spoken are original." The tradition of eloquence was still strong.

Although Andrew White made valuable contributions to the development of English studies in the University, his main interest was in history. His desire for a professorship exclusively in history was gratified in 1863, when Erastus Otis Haven (Wesleyan '42, A.M. *ibid.* '45, D.D. hon. Union '54, LL.D. Ohio Wesleyan '63) returned not only as President but also as Professor of Rhetoric and English Literature. Haven was immediately listed as offering graduate courses in philology and general culture, and a year later English literature was announced for the first time as a senior elective. But such progress as these announcements suggest was probably not substantial; on the contrary, the

program in English must before long have suffered considerable shrinkage. For in 1865, President Haven moved over to the professorship of logic and political economy. He replaced his course in philology with one in logic. He continued to offer his course entitled General Culture; but that seems to have been from the beginning not a course in English but in comparative literature. Only Allen Jeremiah Curtis (Kalamazoo '60, A.M. Michigan '61), Assistant Professor of Rhetoric and English Literature, was left to carry on the work. Then in 1867, Tyler came.

The events of the life of Moses Coit Tyler (Yale '57, LL.D. Wooster '75, L.H.D. Columbia '87) are related in biographical sketches and other passages scattered through University publications and in the notable Jones-Casady *Life of Moses Coit Tyler*, published by the University of Michigan Press in 1933. The *Life* must be read by anyone who in our time would know Tyler's career, his character, and his place in the history of the University and of American scholarship. In 1939 the Board of Regents named one of the new men's dormitories in the East Quadrangle the Moses Coit Tyler House. In making the announcement the *University Record* described Tyler as "the man who more than any other individual awakened the country to the study of its own literary history."

That this is not an expression of merely parochial pride is attested by many witnesses. Barrett Wendell of Harvard said in an address to the Massachusetts Historical Society:

Untiring in research, unflatteringly conscientious to the most minute detail, nor yet ever content until he had so mastered every phase of his subject that he could set forth his results with luminous amenity, Moses Coit Tyler has left for those who follow him through the boundless aridities of our earlier

literature only the comparatively agreeable task of generalization. Whatever he actually did was done so well that it need never be done again. (Wendell, 393-94.)

The only man who, since Tyler, has done work of comparable importance in the literary history of America is V. L. Parrington, himself a guest member of the Department of English in the summer session of 1927 and known internationally as the author of *Main Currents in American Thought*. In his bibliography for the period dealt with in Tyler's books he referred to them twice as "invaluable"—a word of praise which he gives to no other book listed. From the Jones-Casady *Life*, which is always temperate in praise, may be culled such opinions of Tyler as the following:

He was . . . the first great historian of the national mind expressed in literature. . . . Tyler may be said to have inaugurated the heroic age of scholarship in American literary history . . . Tyler's success is a miracle of perseverance and painstaking care. . . . His work remains monumental still. . . . Tyler had written a truly great historical work, generous in its sympathy, revolutionary in its scope and range, brilliant in style—an enduring study, the first great work of scholarship in the field of American literary history.

Nor did Tyler have to wait for the acclaim of posterity. Among other evidences of his eminence in the opinion of his contemporaries, the *Life* tells us that he was included in a list of forty immortals chosen by ballot among the readers of *The Critic and Good Literature*, outranking Dana, Whipple, Lathrop, Story, and Parkman.

Tyler was born in 1835 in Connecticut, spent his boyhood in Michigan, and attended the University of Michigan for one year. He completed his undergraduate work at Yale, studied theology there and at Andover, and, though he never went on to a degree in theology, held pastorates for about three years in the

state of New York. After a sojourn in Boston, he went to England in 1863, and when he returned to this country, late in 1866, it was as a "lyceum" lecturer and a writer for newspapers and magazines. In 1867 he became Professor of Rhetoric and English Literature in the University of Michigan.

Except for an interval of eighteen months in 1873 and 1874, which he spent very unhappily in New York City as literary editor of Henry Ward Beecher's *Christian Union*, Tyler taught at the University of Michigan until 1881. In that year Andrew White, his friend of long standing, offered him the new professorship of American history at Cornell, and, as White himself had done years before at Michigan, he left literature for history. The change, however, was not abrupt; though Tyler had done much to stimulate and guide the appreciation of literature as such, he was always primarily the social philosopher, reading books with an eye chiefly to their historical significance. His main interest will appear clearly to anyone who reads in his many essays or in his books. Of the latter, which show also his growing absorption in American as distinguished from British literature and history, the most important are *The History of American Literature, 1607-1765*; *The Literary History of the American Revolution*; *Patrick Henry* (in the "American Statesmen Series"); and *Three Men of Letters* (Berkeley, Dwight, and Barlow).

Tyler's character is a study in contradictions. Before he came to Ann Arbor he was best known as a health faddist and as a facile popular speaker. A present member of the department remarked recently that he would not be considered now even for a teaching fellowship. Yet it is doubtful if any member of our present faculty has a better record of sound, hard work. The work of some of us may not be referred to half a century hence as

"a miracle of perseverance and painstaking care." His industry, however, was like that of another great worker, Samuel Johnson. It was fitful. "The tranquillity of the place," he wrote after his return from New York to Ann Arbor, "is like balm to my brain and nerves." But this spirit was restless, and he could enjoy tranquillity only as long as he was satisfied with the work he was doing; only as long as he could hold himself to it "without remissness and without misgiving." In his public utterances and in his writings, he appeared to share the complacency of nineteenth-century liberalism, and to accept with most of his contemporaries the current myth of progress; but his diary, like Johnson's, records that his mind was troubled by many doubts and uncertainties. Year after year moods assailed him in which he wondered whether he ought not to return to the Christian ministry. In the main, he controlled his tendency to melancholy. He and his family lived happily together, he enjoyed many friendships, and he delighted his students with his easy eloquence and his humor. His work was sometimes interrupted, but its quality was certainly enhanced, by what the Jones-Casady *Life* calls his "feeling of the dreamlike evanescence of the world."

The influence of such a man as Tyler even in a department of the 1940's would be very great. In his day, he practically was the Department of English, and its history was made by him. At first his teaching, except for one course, was in elocution and rhetoric. He did this work conscientiously, and, according to contemporary evidence, exceptionally well. But his important report to the president in 1872 indicates that it brought him more weariness than satisfaction. He spoke of the "delicate and fatiguing task" of reading essays and listening to speeches. He was searching hopefully for some method of "teaching English litera-

ture to students like ours." It was in the study and teaching of literature that his real interest lay.

The Jones-Casady *Life* stated that in 1874, when he returned from New York, Tyler, with Angell's approval, "cut himself entirely loose from the instruction in elocution and rhetoric, and devoted his time to teaching literature." Hinsdale said that in 1874 Tyler's title was changed to Professor of the English Language and Literature (Hinsdale, p. 241), and the *Alumni Catalogue* published in 1923 also dates the new title from 1874. The *Proceedings* of the Regents (at that time not fully nor always accurately indexed) shows no earlier official change. But the annual catalogues for the years from 1867 to 1873 behave rather capriciously: according to them, Tyler's professorship was of rhetoric and English literature in 1867-68, 1868-69, and 1870-71; but of the English language and literature in 1869-70, 1871-72, and 1872-73. His report in 1872, mentioned above, appears in the *Proceedings* as coming from the professor of the English language and literature, and the same title appears elsewhere in the *Proceedings* of these years. It is evident that Tyler's inclination from rhetoric to literature was strong during his earlier residence at Michigan, and that his inclination received at least semiofficial approval.

In the part of the Hinsdale-Demmon *History* written by Hinsdale, Tyler's coming is said to have "marked a change in the English department; henceforth attention was paid to the study of literature as well as to its accessories" (Hinsdale, p. 55). This statement implies not so much the shift from courses in rhetoric to courses in literature as the adoption of the method of literary study for which Tyler had been searching. His desire was that students might "come to know for themselves the exhilaration of original research." By "research" Tyler did not

mean quite what we now understand by the word, nor what he himself practiced. His first hope was only to escape from "the difficulty of interesting young people in critical estimates of books which they had never before seen or heard of." Nevertheless, the assignment of readings in original sources led not only to the introduction in 1875 of the senior course announced as the Study of Masterpieces, but also to the offering of graduate seminars; though, as Hinsdale remarked, the word "seminary" was slow in finding its way into the catalogues. By 1881, when Tyler left for Cornell, the main course for future programs in English was set at the University of Michigan and also at other American universities, as the result largely of the pioneer work of Tyler.

From 1881 to 1920, a period of thirty-nine years, Isaac Newton Demmon ('68, A.M. '71, LL.D. Nashville '96) was Professor of English and head of the Department of English. His connection with the University dates from 1865, when, after two years in Northwestern Christian University (now Butler College) and a term of service as a soldier in the Civil War, he entered the class of 1868. After his graduation he taught Greek at Alliance College, ancient languages at Hiram College, and mathematics at Michigan. For three years after that he was Principal of the Ann Arbor High School. In 1876 he returned to the University as Assistant Professor of Rhetoric and History, succeeding Harry Burns Hutchins, later President of the University, in that position. In 1879 his title was changed to Assistant Professor of Rhetoric and Anglo-Saxon, and in 1881 to Professor of English and Rhetoric.

During the headship of Demmon a good many persons believed that the department was not moving forward as it should. It is certainly true that Demmon did not favor expansion or inno-

vation. Generally speaking, he adopted changes in departmental policy reluctantly, often after holding out for some time against the pressure, not only of advice, but also of events. He was not, as Tyler was, a brilliant teacher. He was not, as Tyler was, a distinguished author. It may be that he did not receive his rightful share of the distinction that came to Tyler, for he was heard in his old age to say somewhat ruefully that in the opinion of his friends his part in the making of *The History of American Literature* had been much greater than Tyler's brief note in the Preface acknowledged. Although he read with approval and appreciation anything well written by a member of his staff, he had so strong a distaste for what Henry Seidel Canby has recently called "cross-word puzzle scholarship" that the encouragement he gave others to publish was far from urgent.

The man who during the years around 1900 attracted students from all over the country, and, notably, advanced students from the East, was Fred Newton Scott. In recognition of his eminence the Department of English was divided, and Professor Scott was for the rest of his time on the faculty (1903 to 1927) head of the Department of Rhetoric (see Part III: DEPARTMENT OF RHETORIC).

And yet—not long ago a woman of Ann Arbor whose memories of the University community run back into the days of Angell and Frieze and Adams and White and Cooley and the rest of the famous men of their generation was asked who was the biggest of the giants that were at Michigan in former times. She answered, as one surprised that the question needed to be asked: "Why, Mr. Demmon." Giants of this breed cannot, of course, be measured; but the fact that such an answer could be given means something.

The one man who could have written with authority concerning Demmon, and concerning the Department of English during his administration, was Louis A. Strauss. If he had lived to do it, he would have written the article for which this is only a substitute. Fortunately, he did leave a record covering this period of the department's history which it would be a wanton waste not to draw upon here. A digest, whenever possible in Strauss's own words, follows. The original, a memorial read before the University Senate on November 22, 1920, may be found most conveniently in the *Michigan Alumnus* for March, 1921:

A ripe old age had crowned a life of incessant labor and high endeavor, a life replete with varied achievement and enriched by such a range and depth of experience as few men, and only big men, can know . . . Mr. Demmon died, as he had lived, a fighter to the last—a passionate devotee of truth and right and justice as he saw them, an uncompromising hater of sham and selfishness and oppression, according to his lights. Moderation was not one of his virtues: brutal frankness was . . . A thing was good or bad—there was seldom a middle ground. He spoke his convictions with a courage and disregard of convention that commanded the respect even of those who disagreed with him. His intensity frequently betrayed him into bitterness, but never into dishonesty. Friend and foe alike have felt the lash of his scorn . . .

We shall consider his services to the University to which he devoted his life, under the following heads: 1. The Educator; 2. The Compiler of University Records, and Editor of University Publications; 3. The Bibliographer and Builder of the English Library; 4. The Teacher and Scholar.

1. From the outset of his career Professor Demmon evinced a keen and profound interest in educational problems, large and small, and exerted a powerful influence toward their settlement . . . Before the faculty of his college Mr. Demmon was invariably an ardent advocate of justice to the secondary schools . . . He held unwaver-

ingly to the belief that the system of admission to the University by certificate from accredited schools, which the University of Michigan did so much to establish and standardize in the middle west, is incomparably better than the system of admission upon examination. . . . It would thus appear that, in matters of educational policy, Professor Demmon was anything but a hide-bound conservative. On the contrary, he was progressive in his views, and a constant growth in liberalism is manifest to anyone who studies his life That he did not stubbornly maintain a position in the face of obvious tendencies is well illustrated by his conduct in the matter of graduate fellowships. For many years he had flatly stood out against them. He said he did not believe in hot-house methods of building up and maintaining a graduate school. Gradually his views altered, until in 1909-1910, during his chairmanship of the Graduate Council, the Board of Regents, for the first time in the history of the University, set aside a considerable sum from the general fund for the support of fellowships; and this was accomplished largely through Mr. Demmon's influence

2. Professor Demmon's arduous labors upon the early records of the University, the general catalogues, and necrology, are perhaps better known than appreciated by many of his colleagues Mr. Demmon's close friends frequently deplored his activity in this seemingly ungrateful field and urged him to discontinue the work, but the value of his efforts to the University and his efficiency, born of long training and enhanced by the possession of a prodigious memory, naturally induced the administrators of the University to avail themselves of his services as long as possible Chief among the University publications brought out by Professor Demmon are: "The Semi-centennial Celebration of the Organization of the University of Michigan" (1888), "The Quarter-centennial Celebration of the Presidency of James Burrill Angell" (1897), "General Catalogue of Officers and Students, 1837-1891" (with Professor Pettee, 1891), and two subsequent editions of the same work under his sole editorship, those of 1837-1901 (1902), and

1837-1911 (1912). In 1906 appeared the history of the University of Michigan. The author, Professor Burke A. Hinsdale, died in 1900, and the Board of Regents entrusted to Mr. Demmon the difficult task of completing and editing the work and seeing it through the press. The trust was executed with his customary care and fidelity and with complete success

3. Undoubtedly the work which Professor Demmon loved best and in which he achieved results of the most significant and lasting benefit to the University was that done in connection with the library. Any day he might be seen spending hours in the cataloguing rooms poring over book catalogues or checking up accessions, or in the stacks hunting for lost or misplaced volumes, or in the reserved collections jealously looking to the safety of the University's choice treasures, or in the bindery giving directions for the preservation of some frail victim of the ravages of time, or in the corridors soundly berating some luckless library official for delivering a rare first edition into the hands of the Philistines—the students Thanks to his untiring zeal and industry, the University possesses a Library of English Literature that is not approached in completeness and working value by any university library in the west An eminent antiquarian book-dealer in New York once told a member of this committee that in his opinion Mr. Demmon was the best posted man as to English books and their market value, and on the whole the wisest purchaser in the United States Many of his purchases have increased ten and twenty-fold in value, and would therefore have been beyond the reach of the University at a later time The McMillan Shakespeare Library, the English Dramatic Library, the Carlyle and New England collections are notable achievements, but they are probably less significant as evidence of his thoroughgoing work than is the solid and representative character of the English library as a whole He built for the future, and the future will build for him, upon the broad foundations he has laid, a monument more enduring than brass.

4. Liberal as were his views in matters of University policy, as a teacher and scholar

Mr. Demmon was distinctly conservative. "A Man of the Old School" he was commonly called. This means, first, that his interest in his subject was broad and general, rather than highly specialized; and secondly, it means that he deprecated and resisted the latter day tendency to import into literary criticism and history the implications and methods of modern science Whereas he took the lead in general educational reform and progress, in his own subject he followed, regretfully and sadly, the tendency of the times Professor Demmon was anything but a showy teacher. He was less fluent in the class room than in the forum, where opposition frequently stirred him to eloquence. But he had traits that are more valuable in the long run than the ability to deliver impressive lectures or to make recitations "go" by dint of bustling methods, or a masterful domination of the class room through the imposition of his own personality The atmosphere of Mr. Demmon's classes was surcharged with fine emanations from his mind and character that were bound to make themselves felt. There was his reverence for good literature that has fixed the attitudes of thousands of students for life. There was a reserve, characteristic of big men, that at once told the ready instinct of the student mind that this man had vast resources of knowledge that he could but slightly draw upon in the class room There was, again, a large idealism, bafflingly allied with the shrewdest common sense—a combination typically American and familiar to us all since the days of Emerson Much of his best teaching was done outside of the class room. He was always glad to talk informally with individual students Combined with the traits mentioned before, his geniality, his accessibility, his interest in and sympathy with the aims and ideals of the students won his way into their hearts and made them his grateful friends forever; and the majestic beauty of his face—an ideal teacher's and scholar's face—completed an impression that a student might well cherish as one of the greatest gains of his college course.

Notwithstanding Demmon's conservative policies the department under his

direction grew steadily. A reading of the successive announcements makes this clear. Although at first Demmon took over the courses which had been given by Tyler and entrusted his own to Benjamin C. Burt, within a few years the work began to be spread. More and more, courses were assigned in accordance with the special trainings and abilities of the growing staff. Within ten years Demmon's teaching was almost entirely confined to the "Masterpieces" courses inherited from Tyler, and to his seminary in American literature. Before the end of the century, courses in elocution and oratory and in English philology were announced independently of the English departmental program, and, without counting these, the number of the course offerings in English had more than doubled. To one coming to Michigan about 1910, the work in English seemed both in amount and in method very much like the work being done in certain other leading American universities, though, in a few of them, graduate work had been growing faster. Perhaps the pressure of general tendencies was enough for healthy progress; certainly the record of the Department of English in Demmon's time shows few experiments tried and discarded, but rather a gradual and steady onward movement.

Associated with Demmon were a number of men whose names are known to all who work in the English field. Some who left the University to carry on their distinguished work in other universities must be mentioned here. Charles Mills Gayley ('78, LL.D. '04, Litt.D. Glasgow '01), whose "The Yellow and Blue" has been sung by Michigan students and alumni for fifty years, after spending six years as a member of the Department of Latin, taught English for two years, and then went to the University of California, where he became Professor of

English and Dean of the Faculties. Joseph Villiers Denney ('85, A.M. hon. '10, Litt.D. Wittenberg '20), of Scott and Denney's *Paragraph Writing* fame, left Michigan for Ohio State University. There he was Professor of English, for many years Dean of the College of Arts, Philosophy, and Science, and for one year Acting President. George Hempl ('79, LL.D. '15, Ph.D. Jena '89), after teaching English philology and general linguistics here for seventeen years, became Professor of Germanic Philology at the Leland Stanford Junior University in California. George Rebec ('91, Ph.D. '97) began his university teaching as Instructor in English at the University of Michigan, but he is better known for his work in philosophy, first here and later at the University of Oregon. John Strong Perry Tatlock (Harvard '96, Ph.D. *ibid.* '03) began his connection with the Department of English in 1897 and remained until 1915. Since then he has been Professor of English at Stanford, Harvard, and California. Tatlock's successor was Samuel Moore (Princeton '99, Ph.D. Harvard '11), an eminent philologist and Chaucerian who remained in the department until his death in 1934. During his later years he was also editor of the "Middle English Dictionary," his appointment to this work having been recommended by a committee of the Modern Language Association of America. Shirley Wheeler Smith ('97, A.M. '00) was Instructor in English from 1898 to 1901. He left, but he soon returned; and he still serves the University as Vice-President and Secretary.

This roster of eminent names—and it might have been made longer—suggests that under Demmon's direction the Department of English rapidly grew away from anything resembling a one-man department. The tendency has increased even faster since his retirement. It would be a tedious task either to set down or to

read the names of the present members of the department, numbering about fifty. For the greater part, those who survive from Demmon's regime and those who came later must await the notice of a future chronicler.

But one name runs through so much of the history of the department during the past two decades that it demands more than passing attention. Demmon's successor, not as head but as chairman, was Louis A. Strauss ('93, Ph.D. '00). He spent most of his life in the University, and most of his life was devoted to its service. Immediately after his graduation in 1893 he entered the department as an assistant in English. In September, 1938, he began his forty-sixth year of teaching with undiminished zest and apparently in good health, but on the second day of the semester he died.

For many years Demmon had depended increasingly on Strauss's advice in the management of the department, and there was no doubt as to who was best qualified to succeed him. It is certain that Professor Strauss welcomed the appointment as chairman rather than as head. At first he tried calling the department to sit as a kind of committee of the whole, but this purely democratic system proved unwieldy and sometimes embarrassing, and it was abandoned by common consent. Since then, although regular meetings of the whole department and meetings, as needed, of different subcommittees have been held, official actions have ordinarily been taken by a departmental executive committee. This committee has been variously constituted; at present it is made up of those members of the department who are full professors.

Strauss was an excellent presiding officer. The fullness of his experience and the clarity of his thinking gave him definite opinions on most questions under discussion, and he presented his opinions

cogently. But it was not in his nature to be overbearing. He never exploited his authority. In argument he always shed more light than heat. He was never intolerant or impatient even with those who were both intolerant and impatient.

To quote Earl Leslie Griggs's "Appreciation" (Griggs, p. 38), Louis Strauss, "born before the day of specialization, made all learning his business. He seemed to have read everything in English literature." He was well read also in other literatures, particularly in German. He was a lover of good music, and he had an almost professional knowledge of it. In this, and in his interest in painting, he resembled Browning; and his course in Browning, the course most familiarly associated with his name, was correspondingly strengthened. A man of great learning, he never paraded his learning. He had no touch of what is supposed to be the professorial manner. He was on friendly terms with all sorts and conditions of men, including tinkers and mechanics, men in locker rooms and guides on the northern lakes; and always without a hint of condescension, but because he was simply interested in what they did and what they thought.

Strauss wrote well, but he published little. Whatever he did publish was recognized as of high quality. After the appearance of his edition of Farquhar, for example, the reviewer for the *London Times* said that the introduction was the most sensible essay on Restoration comedy he had ever seen.

In his teaching Strauss was eminently successful. To the last his courses maintained their drawing power and their strong influence. Much as the world had changed since his career began, he never felt, and others never felt, that it had left him behind. He was not too much disturbed by innovation and experiment, but viewed them with a regard at once speculative and sympathetic. What his

deepest feelings were, even his dearest friends often wondered. They found in him, however, a serenity that seemed to say:

What is excellent,
As God lives, is permanent.

Like Demmon, he was active in University affairs, not only in matters of general policy, but particularly in positions that brought him into personal contact with students. For many years he was the chief faculty sponsor of student dramatics. For some time before its work was taken over by the office of the dean of students, he was chairman of the University committee on student affairs. Later, for five years, he was chairman of the University Board in Control of Student Publications. In all these exacting positions he was acclaimed by students and faculty alike for his fairness and wisdom. In 1933 the *Michiganensian* was dedicated to him—one of many evidences that he and his work were appreciated.

In his administration of the department, Strauss never looked out for his own interests. He knew this, and he was frankly proud of it. The rest of the men in the department knew it too, and harmony prevailed. To quote again from Griggs's "Appreciation" (p. 39):

The epithet I have heard used most frequently to describe him is beloved A young member of our staff—and he will forgive me, I know, for venturing to include so personal a reference—told me with tears in his eyes—"I loved that man."

When, in 1936, Strauss was upon his own request relieved of the chairmanship of the department, he was appointed Isaac Newton Demmon Professor of English. The appointment was approved by the Regents "in view of his success throughout the years in developing an unusually strong department of English." Perhaps the most obvious evidence

of the strengthening referred to is to be found in a number of important additions to the staff. James Holly Hanford (Rochester '04, Ph.D. Harvard '09), a leading authority on Milton and now of Western Reserve University, came in 1921. In the same year came Oscar James Campbell (Harvard '03, Ph.D. *ibid.* '10), now of Columbia University, whose activity both as teacher and scholar has been largely devoted to the drama. Earl Leslie Griggs (Colorado '22, Ph.D. London '27), who came in 1929 and is now at the University of Pennsylvania, is well known as a Coleridge specialist. Howard Mumford Jones (Wisconsin '14, A.M. Chicago '16) joined the department in 1930. Now at Harvard University, he continues his widely read studies in American literature and American culture. These men were members of the department for eight, fifteen, ten, and six years respectively. Their contributions were varied, but they were all alike in the stimulus which they brought to our teaching, and in their help in building the program for graduate study. Others who began their work at Michigan in Strauss's or in Demmon's time might be spoken of in similar terms; but since, happily, they are still active in the department, no account of their achievements is ready to be written.

The following holders of the fellowship in creative arts, which was established and maintained during President Burton's administration, were in effect and to its great advantage associate members of the English Department: Robert Frost, then as well as now perhaps the most eminent of American poets; Robert Bridges, poet laureate of England; and Jesse Lynch Williams, American dramatist and novelist (see Part II: FELLOWSHIPS IN CREATIVE ARTS).

Many distinguished scholars have been at times, oftenest during summer sessions, guest members of the depart-

ment. Among them were: V. L. Parrington, already mentioned with reference to his *Main Currents in American Thought*, from the University of Washington; Ernest de Selincourt, of Birmingham, England; H. E. Woodbridge, from Wesleyan University; T. M. Parrott, from Princeton; H. S. V. Jones, from the University of Illinois; Douglas Bush, from Harvard; Ernest Sutherland Bates, editor of *The Bible as Living Literature* and celebrated historian of American traditions; G. E. Reynolds, from the University of Colorado; R. P. McCutcheon, from Tulane University; Louis B. Wright, from the Huntington Library; and Jacob Zeitlin, from the University of Illinois.

One of the earliest policies adopted during Strauss's chairmanship involved the abandonment of the survey course as an introduction to English literature. Instead of attempting to teach sophomores the history of English literature, the staff turned to the less ambitious but still hard task of teaching them how to read, introducing historical considerations only as they might be needed for the appreciation of individual authors. Like Moses Tyler long ago, we were conscious of "the difficulty of interesting young people in critical estimates of books which they had never before seen or heard of." If we did not commit ourselves to Tyler's hope, that they might "come to know for themselves the exhilaration of original research," it was partly because we were trying to adapt the method to students who were younger and possibly not as well prepared as his.

The year 1924 saw the introduction of the English honors course for seniors, an offering which put on record again the department's belief in the value of emphasis on the student's own reading. Admission to this course was limited "to students of high standing and to those deemed qualified to do independent work." At first nine hours of credit were

given in each semester of the senior year. Later, in order to allow greater flexibility in the making of senior programs, the work was reduced to correspond to five hours of credit in each semester, and a three-hour preliminary course for juniors was added. Members of the department in charge of the honors work have carried it in addition to their regular teaching schedules. Their successful experience has been drawn upon in the planning of the degree program for honors in liberal arts, instituted by the College in 1939.

The English proseminar, providing for studies in several different fields, was introduced in 1927. It is expected that candidates for the master's degree will elect three proseminars, giving six hours of credit in all toward the total of twenty-four hours required for the degree. By this provision not only candidates for the doctor's degree, who elect seminars, but also all graduate students have some training in advanced, independent work.

Early in 1928 the Division of English, embracing the Departments of English, Rhetoric, and Speech, was established by authority of the Regents. This rather loose organization, operating chiefly in the field of graduate work, lost most of its usefulness in 1930, with the complete reunion of the Departments of English and Rhetoric. There were good reasons for their separation in 1903, and even better reasons for bringing them together again in 1930, but the story is too long to be told here. It may be read in the thoroughly informed account written by Strauss for the *Michigan Alumnus*. It is safe to say that nobody concerned would welcome a second separation.

Among the richest contributions which the work in rhetoric brought to the reunited department were the Avery Hopwood and Jule Hopwood prizes for creative writing. The administration of this

endowment is explained in a separate article.

Other articles deal with the immense labor being done by members of the department in editing the Middle English and the Early Modern English dictionaries.

When the College of Literature, Science, and the Arts ordered the division of student work into a general and a degree program, each two years long, the Department of English Language and Literature took the action quite seriously. It set rather exacting requirements for admission to concentration in English, including the requirement of a qualifying examination before third-year work might be undertaken. There seems to be a general opinion that the department has been too exacting in this respect, as no other department has thought it wise to adopt a similar policy, and, accordingly, the year 1939-40 was the last in which the concentration qualifying examination was given.

Since the department became responsible in 1930 for the work in freshman composition, it has tended to ask for fewer impressionistic sketches and for more themes that test the student's power of clear analysis and sound construction. This does not mean a declining interest in the finer and rarer elements of writing. It does imply a conviction that the use of language as an instrument can with some success be taught to the average student, and that he may be guided to the attainment of a respectable degree of literacy. Those who have the interest and competence to write with a less utilitarian purpose have in advanced courses a wide range for the exercise of their talents.

In order that the department may know what to expect of incoming freshmen, and that high-school students and their teachers may know what the department expects, it has conducted for

some years what is known as the Correlation Project. Teachers from certain schools, large and small, are invited to send several times a year samples of their students' work, each set containing a theme written by each member of a class in composition. Members of the departmental committee in charge of the work then read, comment upon, and grade the themes, and return them. The work with freshmen is definitely benefited by the interchange, and the teachers who co-operate are good enough to say that they and their students share in the profits.

In other ways, too, the department works to improve its teaching. Frequent conferences are held with high-school teachers who are in residence for graduate work. In such conferences the teachers exchange ideas, and by showing what their problems are they help the staff not only to deal wisely with the young people, but also to give future teachers better training.

To come now suddenly to the top of the academic ladder, there are the summer programs for advanced study in different fields. These are conducted

under the auspices of the University, not of any single department (see Part IV: SUMMER SESSION). In organizing two of them, however—the Linguistic Institute and the Graduate Conference on Renaissance Studies—the Department of English has had a leading part. It was also active in the graduate study program in American culture and institutions, in the summer session of 1940. These programs all bring to Ann Arbor scholars of international reputation, and many less well known who come to confer and learn.

It is not by accident that this writing has slipped into the present tense, for most of the things that have been said about the department during Professor Strauss's chairmanship apply equally to the present regime. In 1936, after the dean of the College had asked the opinions of the members of the department, Louis Ignatius Bredvold (Minnesota '09, Ph.D. Illinois '21) was appointed Chairman. His policy, and that of the department, is to consolidate and to further the progress made in earlier years.

W. R. HUMPHREYS

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THE DEPARTMENT OF RHETORIC

BEFORE there was English literature at Michigan, there was rhetoric. It is true that a freshman entering the University as far back as 1844 would have found no required composition to mar the pleasure he might take in his Latin and Greek and mathematics. But in his sophomore year he would have to spend one-third of his second term mastering Newman's *Rhetoric* and making practical application of its principles. By 1845-46, if we are to believe the penciled emendations of the available copies of that year's *Catalogue*, rhetoric (probably Newman's) had edged its way into the first term of both the freshman and sophomore years, and Whately's *Rhetoric* was one of four subjects required in the third term of the junior year. Except for the substitution of Blair for Whately, this arrangement was maintained up to 1850-51. By 1852, however, English Language and Literature had replaced Newman's classic in the first term (of the scientific course; it was not prescribed in the classical course), and had been added in the second term. Elocution had been made a third-term freshman subject, while rhetoric proper was reserved for the first term of the sophomore year for both classical and scientific students.

The nature of the rhetoric work, as well as that in English language and literature, in this early period may be inferred from extracts from the announcements. Thus, in the *Catalogue* for 1852-53, one reads: "The Professor of Ancient and Modern Languages and the Professor of Intellectual and Moral Philosophy take charge of this branch jointly." In 1853-54, the statement read:

Rhetoric is attended to as a special recitation but one term by students of the Classical

Department; but constant attention is directed to this important subject by the professors of Ancient and Modern Languages. Weekly exercises are attended by the students during the entire course.

The students of the Scientific Department receive instruction by lectures, upon the History and Analysis of the English Language, and give especial attention to the study of Rhetoric.

Original essays will frequently be required in this Department.

It would appear that the Professor of Intellectual and Moral Philosophy had now relinquished his interests in rhetoric.

The information in the 1854-55 *Catalogue* was still more explicit:

During two terms of the first year, the members of the Scientific Department devote one third of their time to the study of the English Language and Literature. The object of this plan is to secure an examination of the principles of our native tongue, as thorough and exact as that which is necessary for the mastery of a foreign language. The survey of our general Literature is necessarily cursory, and is designed chiefly to establish fundamental principles of criticism, and to cultivate correctness and propriety of style.

All members of the Sophomore class, in both departments [classical curriculum, or "course," and scientific course], have a daily study in Rhetoric during the first term of the year in which a good text-book is examined, and a course of lectures given by the Professor, and original Compositions are presented by the students every week for criticism.

Declamations are required regularly through the whole course; and during the last two years the pieces spoken are original, and previously presented to the professor, for criticism.

It is instructive to learn that students of eighty-five years ago were expected to master their native tongue as thoroughly as any foreign language!

The emphasis on oral expression suggested in the extracts quoted continued to a much later period. Thus, in 1875, a freshman would have been privileged to enroll in a course, labeled quite simply "1," which included lectures in elocution, "with exercises for the voice, and the delivery by each student of two original speeches" (*Cal.*, 1875-76, p. 37). His texts would have been Tancock's *English Grammar*, Morris' *Elementary Lessons in Historical English Grammar*, and Earle's *Philology of the English Tongue*. By 1886-87 the title of the freshman course was Composition and Elocution, but the *pièce de resistance* was still "two speeches." It was not until much later that written composition became the essential work in first-year courses.

Indeed, until well into the seventies, continual emphasis seems to have been laid on the art of speaking well, not only in freshman but also in later years. The *Catalogue* for 1869-70 carries the following summary of work under the heading English Language and Literature:

FRESHMEN.—English Language—Lectures.

Exercises in declamation every Monday at 4 P.M. at the Old Chapel. A public exhibition, the participants in which are chosen by the Professor in charge of this department.

SOPHOMORES.—The art of effective expression—Haven's *Rhetoric*; Lectures. English Literature—Lectures; Chaucer's *Legende* of Goode Women (Corson's Ed.). Exercises in composition every Monday at 3 P.M. at the Old Chapel. Two public exhibitions, the participants in which are volunteers.

JUNIORS.—Exercises in the delivery of original speeches every Monday at 2 P.M. at the Old Chapel. A public exhibition, the participants in which are chosen by the Faculty.

SENIORS.—Exercises in the delivery of original speeches every Saturday morning in the Chapel before all the classes. A public exhibition, the participants in which are chosen by the Faculty.

There was, however, a gradual shift toward written work, though essay writing seems for a long time to have been generally reserved for the second year. Thus, in 1874-75, the University of Michigan sophomore took a course labeled *Rhetoric: Theory and Practice*, for which he wrote compositions exemplifying the principles set forth in Day's *Art of Discourse*. By 1880-81 the textbook in this course had been changed to O. J. Hill's *Science of Rhetoric*, and each student was required to present two essays. This, in general, seems representative of the second-year course.

The department in which these courses were offered was known as English Language and Literature. This title had been first adopted in 1869, succeeding the old heading *Rhetoric and English Literature*, which in turn had in 1854 replaced the original division-name *Rhetoric*. In 1882 the department was rechristened *English and Rhetoric*. This change may have occurred in deference to a new course that had unobtrusively crept into the announcement for the previous year (*Cal.*, 1881-82, p. 42): "13. Grammatical and Critical Study of Selections in Prose and Poetry. *Tuesday and Thursday*, 4-5. Assistant Professor Burt." By 1883-84, this course had become *Rhetorical Study of Selections in Prose and Poetry* (*Cal.*, p. 46), the probable ancestor of the present course called *Rhetorical Analysis*. In 1886-87 there appeared another new course title, destined to become well known on the University of Michigan campus: *Seminary in Rhetoric and the Principles of Literary Criticism*. The name of the department remained unchanged up to 1903,¹ when the division into Department of Rhetoric and Department of English occurred. During this period a marked increase in the offer-

¹ In the 1897-98 *Calendar* and thereafter up to 1905-6, however, there appeared a new division, "English Philology and General Linguistics."

ings in rhetoric and criticism gave evidence of an emphasis which was, in the next twenty-five years, to raise the University of Michigan to a place of outstanding leadership in this field.

The history of the Department of Rhetoric proper is very much the story of Professor Fred Newton Scott ('84, Ph.D. '89). Scott came to the Department of English and Rhetoric as an instructor in 1889, when his name appeared in connection with the freshman course. As an assistant professor in 1890, a junior professor in 1896, and a full professor in 1901, Scott seems to have rapidly acquired most of the advanced work in rhetoric and criticism. By 1902, the last year before the work in rhetoric was made a separate department, there were listed under his name the following courses:

4. Essays in Description and Narration
- 4a. Essays in Exposition and Argument
15. Principles of Style.
- 15a. Theory of Prose Narrative.
17. Teachers' Course. Methods of Teaching Composition and Rhetoric.
18. Advanced Composition. Essays in Exposition. Interpretation of Literature and Art.
21. Seminary in the Theory and History of Rhetoric.
- 21a. Seminary in the History and Theory of Rhetoric. (*Cal.*, 1902-3, pp. 76-78.)

Other courses in rhetoric and criticism offered in the Department of English and Rhetoric at the time were: Paragraph-Writing, eleven sections, taught by Strauss, Thomas, Bohn, and Morrill; Theme Writing, eleven sections, by Strauss, Thomas, Bohn, and Morrill; Studies in Diction and Usage, two sections, by Fulton; and Principles of Literary Criticism, by Demmon.

The Department of Rhetoric came into existence as a separate unit—mainly, it is said, because Professor Scott wished

it so—in 1903 (see Part III: DEPARTMENT OF ENGLISH LANGUAGE AND LITERATURE). The *Proceedings* of the Regents carries under April, 1903, the entry:

On motion of Regent Dean, the title of Professor I. N. Demmon was changed to Professor of English, and the title of Professor Fred N. Scott was made Professor of Rhetoric by the full vote of the Board. (*R.P.*, 1901-6, p. 172.)

And in the *Calendar* for 1903-4 the Department of English and the Department of Rhetoric were for the first time separately listed. The change occurred with no particular disturbance to courses. Men who had been teaching literature and composition were given their choice of remaining with the old, or entering the new, department. It is of interest that Louis A. Strauss, who had been Assistant in English in 1893 and Instructor in 1895, was one who elected to stay with the old division.

Scott carried with him the elementary work in composition and the advanced courses in rhetoric and criticism which he and others had been teaching. In the *University Calendar* for the year 1903-4 the new department announced that it would offer two types of courses: (1) courses "to give practice in the leading types of prose composition," and (2) courses to "familiarize the student with the fundamental principles of Rhetoric and Criticism." These offerings totaled sixteen courses, only four of which—Prose Rhythms, Newspaper Writing, Interpretations of Literature and Art, and Reviews—were new. It is worthy of note that two of the new courses were in journalism (see Part IV: DEPARTMENT OF JOURNALISM). A third, Prose Rhythms, was unique in American education; its inclusion in this curriculum was indicative of Scott's many-sided interests in literary problems. The course known as Interpretations was to become one of the

most popular and most valued in the department: it was long a proving ground for students who aspired to do work in practical criticism.

The courses given in this first year were to form the backbone of the work in rhetoric for the next twenty-five years. Some of the titles were changed, some new ones were added, a few were discontinued, but the elementary courses, and certain of the advanced courses in style and rhetoric and composition offered in 1903-4 were to become fixtures in the department, and many of them traditions at the University. Rhetoric 3 and 4 later became Rhetoric 31 and 32, with enrollments running up to the three- and four-hundred mark. Principles of Style was taught up to the time Professor Thomas E. Rankin left the University of Michigan in 1928; the Theory of Prose Narrative, which Assistant Professor Edward S. Everett took over after Professor Scott resigned in 1927, was continued until 1933; Diction and Usage, first taught by Professor Roy Cowden and now by Associate Professor Carlton F. Wells, is still an honored course in the Department of English Language and Literature; and the seminary called Rhetoric and Criticism, continuing in much its original form as long as Scott remained in the University, became the parent of present survey and studies courses in rhetoric and criticism.

In the hands of Fred N. Scott and such capable associates as Joseph M. Thomas, T. E. Rankin, Herbert S. Mallory, Marion C. Weir, Lyman Bryson, John L. Brumm, and later Roy W. Cowden, the department went steadily forward to a position of prominence in journalism, creative writing, and graduate work in rhetorical theory and criticism (see Part IV: DEPARTMENT OF JOURNALISM). Students interested in these subjects were attracted to the University of Michigan from all parts of the country, and, in due

course, added to the steadily increasing list of prominent writers and scholars who had "studied under Scott."

Shirley Smith, now Vice-President of the University and once an instructor in rhetoric, writing on "Fred Newton Scott as a Teacher" in the *Michigan Alumnus*, listed the following as former students of rhetoric who had contributed information for his article: Professor Richard R. Kirk, of Tulane University; Professor Karl Young of Yale University; Lyman L. Bryson, Director of the California Association for Adult Education; S. Emory Thomason, Publisher of the *Chicago Daily News*; Lee A. White, of the *Detroit News*; and Arthur Pound, author, New Scotland, New York.

This is but a fraction of the roll of important names that might be called of those who once studied in the Rhetoric Department. The list would include Ernest Sutherland Bates, college professor and famous author; Alice Snyder, Coleridge scholar and Professor of English at Vassar; Wilfred B. Shaw, author, Director of Alumni Relations, and Editor of the *Michigan Alumnus Quarterly Review*, Ann Arbor; Webb Waldron, novelist, journalist, and publicist, Westport, Connecticut; Paul Osborn, playwright, New York City; Avery Hopwood, playwright, and donor of the Hopwood prizes; Ray Stannard Baker ("David Grayson"), author, Amherst, Massachusetts; Katherine Holland Brown, novelist, Quincy, Illinois; Ada F. Snell, Professor of English at Wellesley College; Joseph Thomas, Professor of English and Dean of the Senior College, University of Minnesota; Marjorie Nicolson, Professor of English and Dean of the College, Smith College; James Oliver Curwood, author; Edgar A. Mowrer and Paul Scott Mowrer, journalists extraordinary, Chicago; Edwin S. Beck and James O'Donnell Bennett, journalists, the *Chicago Tribune*; Karl Edwin Harri-

man, editor and author, New York City; Fletcher Harris, Professor of English and Assistant Dean of the College at the University of Illinois; Charles C. Fries, philologist and Professor of English, University of Michigan; Winthrop D. Lane, journalist and editor, Trenton, New Jersey; Louis V. De Foe, critic, New York City; Lawrence Conrad, teacher and author, Montclair, New Jersey; Wilson Farrand, educator, Newark Academy, Newark, New Jersey; Melvin T. Solve, Professor of English, University of Arizona; and Harold Titus, author, Traverse City, Michigan.

Many other names might be added, but there is space to mention only a few—Charles Phelps Cushing, author and photographer, New York City; Paul Blanshard, lecturer and specialist in industrial relations, New York City; Jo Chamberlain, formerly Managing Editor, *Scribner's Magazine*; Warren Bower, New York University; Walter A. Donnelly, Editor of Museums Publications and Supervising Editor of Publications in the Registrar's Office in the University; Phyllis Povah (Mrs. Henry Drayton), actress, Port Washington, Long Island; Mary Yost, Dean of Women, Stanford University; Ruth Mary Weeks, educator, Kansas City, Missouri; Helen Mahin, Professor of Journalism, University of Kansas; Dorothy Tyler, poet and editor, Detroit; and Martin Feinstein, poet, deceased.

From the beginning, the Department of Rhetoric was attractive to graduate students. Advanced degrees in rhetoric had been granted under the old Department of English and Rhetoric. Gertrude Buck had taken a master of science degree in rhetoric in 1895, and in 1898 Annie L. Bacorn had received the degree of master of letters, and Sophie C. Hart and Katherine G. Sleneau the master of arts degree. In the same year, the first doctor of philosophy degree in rhet-

oric was granted to Miss Gertrude Buck, whose dissertation on metaphor was a distinctive contribution in the field. Between 1898 and 1903, in the remaining years of the combined department, nine more students, one of them Ernest S. Bates, took the master of arts degree in rhetoric. From 1904, the first year that degrees were given in the new department, to 1930, the last year, a total of 140 students took the master's degree in this field. In the same period twenty-three students, as compared with a total of twenty-five in the Department of English, were granted the doctor of philosophy degree in rhetoric. The first of these was William E. Bohn, in 1906.

It is worth noting, as significant evidence of a progressive attitude in the department on linguistic matters, that of those receiving the master's degree, Sterling A. Leonard (1909) and Ruth M. Weeks (1913), became distinctive leaders in the liberal movement in language matters that has in recent years taken firm hold in the English pedagogical field.

Graduate study in rhetoric was characterized throughout the existence of the department not only by a broadly liberal point of view in linguistics, with a consistent emphasis upon the growth of language as a social phenomenon and as an instrument for current needs, but also by critical attitudes which had their bases in psychological investigation and in an examination of literature in its relation to life. Merely historical matters were subordinated to the analysis of works and to an understanding of the principles by which their authors wrote and of the sources and modes of their appeal. Scott's own deep humanism permeated the work of the entire department, and graduate study in rhetoric became synonymous with an earnest search for central standards in artistic creation and aesthetic response. The value of such teaching in an age which tends toward

formalistic and historical scholarship is obvious; its influence, spreading in some degree to every school where graduates of the department have taught, has no doubt been greater than can be easily estimated.

A unique and notable course developed by Professor Scott was Rhetoric 23 and 24, first announced in 1909-10, without further description, as a Seminary in Advanced Composition. The next year's *Calendar* (p. 127) carried the following information:

This course is intended for a limited number of advanced students who write with facility and are in the habit of writing, but who desire personal criticism and direction. Although the greater part of the time will be spent in the discussion of the manuscripts submitted for correction, there will be talks upon the essentials of English Composition and the principles of criticism and revision. Open only to students who receive special permission.

This was destined to become one of the most prized offerings of the department. Since only a limited number could be accommodated and since only candidates of ability were selected, it soon came to be regarded as an honor to be admitted to the course. The class became something like a young writers' club, and was a proving ground for many who later gained distinction in the literary field. It was, moreover, a recognition, in principle, of the importance of creative writing as a university study. To it, more than to anything else, can be traced the Hopwood prizes and the outstanding development of present advanced courses in writing at the University of Michigan.

The Avery Hopwood award in rhetoric, established by the Avery Hopwood bequest in 1928, through which excellence in writing is rewarded at Michigan with unusual munificence (see Part III: HOPWOOD PRIZES), had faint foreshad-

owings in the Field poetry prize and the medal awards in rhetoric. The Field prize was established on 1908-9. In the minutes of the Regents' April meeting in 1908 is a copy of a letter to Fred N. Scott containing the offer of the award (*R.P.*, 1906-10, p. 246). The letter reads:

PROFESSOR F. N. SCOTT:

Dear Sir—I will offer a prize of \$100 cash for the best poem submitted by any student in the Literary Department of the University of Michigan. This poem is to be written and submitted to the committee of award on or before May 1, 1909, said committee to consist of the Professor and Assistant Professors of Rhetoric in the University. The terms and conditions of the awarding prize are to be prescribed by the committee, who will make a formal announcement of the same.

Very truly yours,

NELSON C. FIELD, U. of M., '90.

This prize was continued to 1916-17. It was a cash award of \$100, given to the undergraduate writing the best poem of the year. Two outstanding winners were Edgar Ansell Mowrer and Martin Feinstein.

The rhetoric medals were established in 1925 and were given each year to 1930. The statement in the *Announcement of the College of Literature, Science, and the Arts* of 1925-26 (p. 314) explains the purpose and conditions of the awards:

In recognition of exceptional proficiency in Rhetoric, two gold medals will be awarded each year. The first will be awarded to the student about to be graduated who has maintained the best scholarship record in Rhetoric during his university residence, his elections to have covered not less than six courses in the department. The second will be awarded to the first year student who has done the most consistently acceptable work in freshman Rhetoric. The winners of the medals will be chosen, by a faculty committee, from candidates recommended by instructors in the department of Rhetoric.

It is a long way from the Field prize

and the rhetoric medals to the lavish Avery Hopwood prizes, but in these modest beginnings, the principle of recognizing proficiency in rhetoric was established; it is quite possible that they gave Mr. Hopwood the idea for his great gift.

The relation of the Department of Rhetoric to the development of journalism in the University merits notice. In the *University Calendar* for 1890-91 (p. 54) there appeared under "English" a course described as "Rapid Writing. *Two-fifths Course. Hours arranged with instructor.* Assistant Professor SCOTT." It is said that this was the first college course in journalism in America. The work of the course seems not to have been the ordinary news reporting and editing, but rather a study of current news stories to the end of writing editorials on subjects of prominent public interest. By 1893-94 this course (numbered 18) appears to have been rechristened Advanced Composition and to have been designated "for those who are already proficient in writing, but who feel the need of practice and criticism" (*Cal.*, p. 64). It was open only by permission and the number was limited to six! After the Department of Rhetoric was formed in 1903, the announcement carried boldly, as Course 13, "Newspaper Writing: Theory and Practice"—evidently the old course Rapid Writing under a new name. This was the beginning of journalism as an avowed subject of study at Michigan.

It is instructive to find in the minutes of the Regents for September, 1903, that Willis J. Abbot, editor of *Pilgrim*, later, of the *Christian Science Monitor*, had offered to give lectures in journalism without expense to either students or the University; upon the recommendation of Professor Scott, the Regents accepted this proposal (*R.P.*, 1901-6, p. 235). Further evidence of the practical nature of the course called Newspaper Writing,

suggested by this immediate linking with the active field of editing and publishing, is to be found in the description of the work by an old student. According to this student,² each member of the class, using the newspapers as a text, gathered over a considerable period, news stories on any given topic of live interest, such as "Government Control of Monopolies," and wrote editorials on the subject. Another extract from the *Proceedings* of the Regents for October, 1905, shows the extent to which the practical and laboratory method of instruction was carried out in this class: Professor Scott presented to the Board the information that the *Chicago Record-Herald* had given him all the newspaper material for the issue of October 1, 1905; and he asked for and was granted \$15 for mounting this material (*R.P.*, 1901-6, pp. 633-34).

The work in journalism expanded, most of the courses still taught by Professor Scott, until in 1914-15 Lyman Bryson began to take over some of the work. Later, from 1918, John A. Mosenfelder and, after him, John Brumm and Wesley Maurer, assumed the burden of the teaching of journalism up to the establishment of a separate Department of Journalism, with Professor Brumm as its head, in 1929 (see Part IV: DEPARTMENT OF JOURNALISM).

Old West Hall, on the State Street side of the present Betsy Barbour House site, was long a landmark on the campus.³ It had been erected as one of the early ward schools of Ann Arbor, but

² Louis A. Strauss, who gave the writer of this article many valuable facts about early work in rhetoric at the University.

³ For the description of West Hall and its uses, as well as for other valuable material in this article, the author is indebted to Assistant Professor Edward S. Everett, who came into the present Department of English Language and Literature with the Department of Rhetoric.

when that school was moved in 1902 to its new location on Packard Street, the ancient structure was purchased by the University as a temporary makeshift and was sketchily renovated for classroom use. Here, in 1903, Professor Scott and the new Department of Rhetoric took up quarters. The building was later repeatedly condemned, but was not abandoned for over twenty years. It was a byword for inconvenience. It had no private offices and sometimes as many as four instructors would be holding conferences in the same room at the same time. It was so crowded that a passageway less than ten feet wide was used as a classroom, and another of the same sort as office and library. The basement was filled with tons of old themes gathering dust and cobwebs and constituting a fire hazard. President Burton once took a committee through it, exhibiting it as a horrible example of the desperate needs of the University.

In August, 1922, the Regents ordered it removed. In the Regents' minutes one finds this item:

On motion of Regent Murfin, the Board adopted the following resolution:—

Resolved, That it is with regret that the Regents find themselves prevented, by the pressure for class-room space, from removing West Hall for the present year; and be it further

Resolved, That not later than the close of the University year 1922-23, West Hall shall be removed in accordance with the agreement made with Mr. Barbour, the donor of the Betsy Barbour House. (*R.P.*, 1920-23, p. 606.)

Removal was delayed, however, until in May, 1923, the Regents finally voted that the building should be razed. But the actual demolition did not take place until 1924.

Probably no student who ever passed the dingy portals of this crazy old build-

ing and toiled up its creaking stairways—and in the two decades of its use, thousands of freshmen and upperclassmen entered there—ever forgot West Hall. To some it was but a nightmare of required themes, but to many, especially among the advanced students of rhetoric, it was a place of light and inspiration. For here were situated the rhetoric library, presided over for years by the efficient Clara Belle Dunn, and the seminary room of Professor Scott. Scott's room was unique. It contained more than a thousand books, among them his valuable private collection in rhetoric and criticism. The walls were plastered with pictures, some of them copies of masterpieces, some of an unusual, grotesque sort. Many were prints from foreign magazines, *Jugend*, for example; and there were photographs of gargoyles and caricatures of great literary figures. Completing the scene were the round table, about which seminary students sat, and Scott himself, remembered by many as a sort of fixture in the room, comfortably ensconced between the table and his desk, which was always piled high with papers, lecture notes, and books.

It seems not inappropriate to put down here some words about this room written by an old student many years after she had enjoyed its unique privileges:

I have many memories of that room and of those classes, memories which meet oddly in a small seminar that gathered there at four o'clock in the afternoon and stayed until six or any later hour, while the shadows slowly obscured the rows of books, the pictures softened into the walls with dusk, and the wind swayed the branches outside the windows in an ancient detachment from earth-walking things. There was talk of everything conceivable that had to do with beauty and truth, art and humanity. And to at least one student the dusk, the books, the pictures, and the voice of the preceptor were like the song of the wind in the branches, sweeping over all the things of earth. (Mahin, p. 2.)

Across the hall from Scott's room was the rhetoric library. The origin of this library is recorded in the *Proceedings* for April, 1903 (p. 169). The item reads:

Regent Dean presented and read the following communication from Professor Scott, and on motion the President was requested to return to the Macmillan Company of New York the thanks of the Board for their gift to the Library of the University.

To the Honorable Board of Regents:

I have pleasure in announcing that I have just received from the Macmillan Company, publishers, of New York City, a collection of 330 volumes intended as the nucleus of a department library of Rhetoric. The books are given without condition, but with the understanding that they will be placed in the Rhetorical Seminary Room in West Hall (Room 6). The collection consists of standard works in rhetoric, literature and psychology, and is valued at \$260.

I respectfully suggest that your honorable body make a suitable acknowledgment of the gift.

Respectfully,
F. N. Scott

By the time old West Hall was condemned and abandoned in 1923 this library contained a total of a thousand volumes. It was then transferred to the first floor of Angell Hall, where it continued to grow through gifts and special funds until, during the present administration, the Department of Rhetoric and the Department of English were merged. The manner in which a considerable portion of the funds for this library was provided is indicative of the unselfish devotion of various members of the rhetoric staff. Many of the books belonged to Professor Scott or were given to the department by him. In addition the department had a tradition of turning the royalties of certain publications—chiefly compilations by the staff or by members of the staff for classroom use—into a fund for the departmental library. Books that helped in this way included: *Materi-*

als for the Study of Rhetoric and Composition, edited by Thomas E. Rankin and John L. Brumm; *Adventures in Essay Reading*, edited by Thomas E. Rankin, G. S. Lasher, and Amos R. Morris; and *The Way of Composition*, edited by T. E. Rankin, A. R. Morris, Carlton F. Wells, and Oakley Johnson. The most successful of these, *Adventures in Essay Reading*, alone sold more than 24,000 copies, and, according to a recent statement by the publishers, yielded a total of \$4,016.74. A most valuable gift came from Fred N. Scott himself, who upon retiring in 1927 gave to the University his splendid rhetoric collection of many hundreds of volumes.

The roster of men who taught in the Department of Rhetoric during the twenty-six years of its existence is long. Heading the list, from the point of view of length and importance of service, are Thomas Ernest Rankin ('98, A.M. '05), John Lewis Brumm ('04, A.M. '06), and Roy William Cowden ('08, A.M. Harvard '09). Rankin's name first appeared in the records in 1905-6, when, though he was named as Instructor in Rhetoric, all his teaching was done in the Department of Law. In June, 1907, he went over to the Department of Literature, Science, and the Arts and in 1916 was promoted to a full professorship. During the period of his service, he contributed much to the department as both teacher and administrator. He was for many years in charge of the elementary courses in composition, and he later gradually assumed most of the administrative duties of the department. At the time of his resignation in 1928 he was teaching Versification, Drama, and Literary Types and Forms. Other courses which he had developed, by this time discontinued or being taught by others, were Argumentation, Short Story Writing, and Studies in American Style.

John Brumm came to the department as Instructor in 1905, after a period as student assistant in English in the Department of Engineering, and taught various writing courses up to the time of the separation of the teaching of journalism from that of rhetoric in 1929. He was made a full professor in 1923. During this period he developed, or helped to develop, the courses Advanced Composition and Rhetoric, Argumentation, English Prose, Written Criticism, and Journalism. In 1928-29, the last year of the rhetoric-journalism combination, he was in charge of courses designated as Feature Writing, Editorial Writing, Critical Writing and Reviewing, Advertisement Writing, and Newspaper Policy and Management.

Roy W. Cowden began teaching in the Department of Rhetoric in 1909 and has held a full professorship since 1935. He developed, or had a share in developing, such courses as the Mechanics of the English Sentence, Modern English Prose, Diction and Usage (in its later form), and Junior Composition. This last course, tending largely to creative writing, was long a principal feeder for Scott's Seminary in Advanced Composition. Professor Cowden was later made chairman of freshman composition; he served in the period of Professor Jack's chairmanship on the executive committee of the department; and he was, in general, prominent in shaping affairs relating to composition. His great enthusiasm for, and his success in, teaching creative writing led to his appointment, after the Rhetoric and English Departments had merged, as Director of the Hopwood Awards.

Of the many others who deserve special notice in this article there is space for brief mention of only a few. Herbert Samuel Mallory (Western Reserve '99, Ph.D. Yale '04), who came to the department as an instructor in 1908 and served

it most faithfully until 1927,⁴ will long be remembered for his stimulating teaching and his radiant cultural influence. His Short Story Writing was one of the most successful courses offered in the department. Lyman Bryson ('10, A.M. '15), who began his work in the department as Instructor in 1913 and resigned in 1917 to accept a government position, left his mark as a capable teacher of composition and journalism. Marion Clyde Wier (St. John's '92, Ph.D. Michigan '18), Instructor in 1910-11 and Assistant Professor in 1921, was regarded as one of the most successful teachers of creative writing the University of Michigan has ever had, and he is still mentioned by his colleagues and former students for his erudition and for his enthusiasm for poetry.

Men still on the campus who taught in the Department of Rhetoric ten years or more are: Edward Simpson Everett ('14, Ph.D. '21), who came in 1914 as an instructor and was promoted to an assistant professorship in 1925, a teacher of the dependable type upon whom students and colleagues learn to rely; Frederick William Peterson (Lake Forest '11, A.M. Michigan '16), Instructor in 1918 and Assistant Professor since 1925, whose mastery of language and lively interest in his students have made him a favorite professor on the campus; Erich Albert Walter ('19, A.M. '21), Instructor in Rhetoric in 1919 and now Associate Professor of English and Assistant Dean of the College of Literature, Science, and the Arts, whose courses in the essay gave preparation for his notable *Essay Annual* and whose distinctive work in creative writing was recognized by his appointment to the chairmanship of freshman composition and to membership on the Hopwood committee; and

⁴ He was killed, December 30, 1927, in an unfortunate automobile accident. He had been made Assistant Professor in 1918.

Philip Louis Schenk ('02, A.M. '04, B.D. Union '07), a gentleman of the cloth turned teacher, known for his sound courses in report writing and for his friendly interest in students.

Space forbids the mention of the scores of other men who served in the department for a longer or a shorter term in the twenty-six years of its existence. It would seem inappropriate, however, not to include the names of Amos Reno Morris (Ohio State '07, Ph.D. Yale '04), who came to Michigan in 1921 and who maintains one of the traditions of the old department in his course known as Rhetorical Analysis, and of Carlton Frank Wells ('20, A.M. '22), who also dates his teaching experience in rhetoric from 1921 and whose proficiency in the classroom has been recognized by his appointment to the chairmanship of freshman composition, a position which he still holds.

Scott retired from active duties, on account of ill health, in the middle of the year 1926-27, and Rankin, who as chairman of an executive committee had been for some two years the active administrator, took over the affairs of the department. On August 29, 1927, Peter Monroe Jack (A.M. Aberdeen '20), from Cambridge University, was appointed chairman for a period of three years, to succeed Professor Scott. Professor Jack continued as chairman, acting with an executive committee, the other members of which were Professors Cowden and Thorpe, until the Departments of Rhetoric and English were united.

In the *Announcement* for 1929-30 rhetoric was listed for the last time as a separate department. Instructors were given as follows (p. 281):

Professors Jack and Thorpe; Associate Professor Cowden; Assistant Professors Everett, Walter, Peterson, Morris, N. E. Nelson, Schenk, Abbot, Binkley, and Rowe; Mr. Wells, Mr. Baker, Mr. Donnelly, Mr.

Bader, Mr. Proctor, Mr. Stevens, Mr. Bebout, Mr. Butchart, Mr. Hornberger, Mr. Helm, Mr. Hoag, Mr. Ott, and Mr. Boothe.

The course offerings were large and varied. There were listed thirty-eight sections of Rhetoric 1 and 2, nineteen sections of Rhetoric 31, and twenty-three sections of Rhetoric 32. In addition there appeared thirty-six different advanced courses. Among these were most of the old stand-bys of the department, such as Rhetorical Analysis (Morris), Interpretations of Art and Literature and Special Problems in Rhetoric and Criticism (Jack), Diction and Usage (Cowden), and the Drama (Rowe). In addition, there were newer offerings under such heads as Intimate Types of Writing, Biographical Writing, Studies of the Creative Process, Studies in Criticism from the Pléiade to the Lyrical Ballads, and Medieval and Renaissance Rhetoric and Poetic. A glance at the total list gives the impression of a rather overloaded program.

Looking towards a closer co-operation among the related units, the Regents established early in 1928 a Division of English, composed of the Departments of English, Rhetoric, and Speech. The resolution was as follows:

1. That a Division of English be established composed of the Departments of English, Rhetoric, and Speech.

2. That there shall be a divisional committee of nine to be appointed by the Dean of the College of Literature, Science, and the Arts and an executive committee to be composed of the chairmen of the three departments.

3. That these committees shall consider, advise, and recommend to the departments or to the administration in regard to all matters of common interest to the three constituent departments. It is to be understood that the functions of these committees will be those of review in the interests of proper co-ordination and co-operation of the departments concerned. (*R.P.*, 1926-29, p. 444.)

The arrangement thus provided for proved, however, to be but a temporary expedient. The natural interrelation of the work in English and that in rhetoric made a union of the two departments a logical necessity. It was apparent that such a union would serve the interests of both economy and efficiency. Indeed, it had been generally believed that when Professor Scott, who had brought the department into being, retired, rhetoric would be reunited with English. Accordingly, there was little occasion for surprise when the Regents voted, on January 10, 1930, to "reorganize the Department of English and the Department of Rhetoric into a single department to be known as the Department of English Language and Literature" (R.P.

1929-32, p. 156). The details of the plan were to be worked out by a committee composed of the dean and two members of each department. Professors Strauss and Campbell, for the Department of English, and Professors Cowden and Thorpe, for the Department of Rhetoric, were chosen to act with Dean Effinger on this committee. It was agreed as a preliminary basis for action that whatever plan was adopted, the unique values that had been developed in each department should be maintained and safeguarded for the future. After several meetings the details for reorganization were completed, and rhetoric became a part of the new Department of English Language and Literature.

CLARENCE D. THORPE

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THE EARLY MODERN ENGLISH DICTIONARY

IN December, 1927, Sir William A. Craigie, the editor who finally brought the *Oxford English Dictionary* to completion, invited Professor C. C. Fries, of the Department of English of the University of Michigan, to undertake the production of a Dictionary of Early Modern English, that is, of the English language used from 1475 to 1700. As early as 1919, Craigie had proposed his plan for a series of *period* dictionaries as the only way to meet completely the needs of scholars in the English language and of serious students of English literature. He said:

Dealing as it [the *Oxford English Dictionary*] does with all periods of English from the seventh century to the twentieth, it has been impossible for it, beyond certain limits, to devote special attention to any one of these. Yet each definite period of the language has its own characteristics, which can only be appreciated when it is studied by itself, and which are necessarily obscured when it merely comes in as one link in the long chain of the language as a whole. To deal adequately with each period it is necessary to take it by itself and compile for it a special dictionary, as full and complete as may be. . . . As matters stand at present the comparison of the language of one period with that of another both in general respects and in special details can only be done to a very limited extent, with the result that such comparisons as are sometimes made tend to be quite misleading or at the best are incomplete and unsatisfactory.

The invitation to undertake this Early Modern English Dictionary carried with it the offer to furnish as a beginning for the work all the material that had been collected by the *Oxford English Dictionary* which bore upon the period from

1475 to 1700. This material was sorted out from the huge collections of the *Oxford Dictionary* during the summer of 1928 and the academic year of 1929-30 and sent to the dictionary offices of the University of Michigan. Altogether the University received two and one-half million quotations from this source.

Other noteworthy collections which helped to complete the evidence upon which to build the interpretations of the 125,000 words constituting the vocabulary of sixteenth-century and seventeenth-century English were:

(a) The slips called the "Supplement" by the workers on the *Oxford Dictionary*. These were citations which furnished evidence of matters missed by the *Oxford Dictionary* or of earlier or later instances of word meanings than those published in that dictionary. These citations had reached the editors of the *Oxford Dictionary* after the part of the dictionary containing the words with which they were concerned had been published. This body of evidence, amounting to 50,000 slips, was released to the Early Modern English Dictionary in the fall of 1932.

(b) The "Ray Agricultural" slips. These were a collection of citations, amounting in all to some 40,000 items, which Mr. F. R. Ray had gathered during a long period of years with the intention of producing a historical dictionary of agricultural terms to supplement the *Oxford Dictionary* in this particular field.

(c) A word index to Milton's prose and manuscript concordances to the works of Ben Jonson and Nicholas Breton.

In addition to the many quotations received from these sources there was the mass of material resulting from the read-

ing program of the Early Modern English Dictionary carried out from 1929 to 1934. In this reading program the staff of the dictionary was assisted by volunteer readers representing more than two hundred different colleges and universities throughout the United States. Four hundred sixty such readers made substantial contributions to the files of the Early Modern English Dictionary and helped to gather the pertinent quotations from the important sixteenth- and seventeenth-century works of each of some 150 topics, such as architecture, painting, music, cooking, dress, furniture, commerce, astrology, hunting, heraldry, surgery, and dancing. In all, there are in the collections of the Early Modern English Dictionary more than four and one-half million quotations filed under their respective words.

From this evidence the Dictionary of Early Modern English attempts the full description of every word in the English vocabulary as it expresses and records the experience of English people during the sixteenth and seventeenth centuries. The records show an increase in that vocabulary during these two hundred years of approximately 275 per cent, that is, from 45,000 entries for the Middle English Dictionary to 125,000 entries for the Early Modern English Dictionary. This remarkable growth of vocabulary is by no means limited to the masses of learned words borrowed from the classics and the many names for strange goods imported from the Indies, Russia, and the New World. The records show an enormous increase in the colloquial vocabulary. For example, there is the great number of new words for "striking, beating, thrashing" that are first recorded in the sixteenth century. Some of them are to bang, to baste, to box, to cudgel, to cuff, to lace, to lam, to lick, to pummel, to punch, to thump, to thwack, to whop.

But far exceeding the number of new

words added to the English vocabulary during the sixteenth and seventeenth centuries is the number of new meanings in which these words were employed. The new evidence collected by the Early Modern English Dictionary not only establishes many meanings not recorded by the *Oxford Dictionary* but pushes back the history of words and word meanings by means of quotations that antedate the first Oxford citation from twenty-five to three hundred years. A good example is furnished in the case of "labour." For the meaning of "labour" in an economic sense defined as "physical exertion directed to the supply of the material wants of the community; the specific service rendered to production by the labourer and artisan," the *Oxford Dictionary* finds the earliest quotation in Adam Smith's *Wealth of Nations* (1776); and for the sense "the general body of labourers and operatives, viewed in its relation to the body of capitalists, or with regard to its political interests and claims," the *Oxford Dictionary* finds the earliest quotation in S. Walpole's *History of England* (1880). The Early Modern English Dictionary, however, pushes back the history of the use of the word *labour* in these economic senses to the late fifteenth and early sixteenth centuries.

The editorial staff of the Early Modern English Dictionary has consisted of the following persons in addition to the editor, Charles C. Fries: H. T. Price, M. P. Tilley, J. E. Hull, L. L. Rockwell, Hope E. Allen, J. K. Yamagiwa, C. E. Palmer, and Katharine Fellows.

From the beginning of the enterprise in 1929 to June, 1938, the work upon the Early Modern English Dictionary was made possible by the funds supplied first by the General Education Board and later by the Rockefeller Foundation. The total funds received amounted to nearly \$185,000.

CHARLES C. FRIES

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THE MIDDLE ENGLISH DICTIONARY

A LARGE-SCALE dictionary of Middle English (the English language from 1100 to 1475) was first undertaken by Professor E. Flügel of Leland Stanford Junior University, with the financial support of the Carnegie Foundation. After his death the Modern Language Association of America took up this project and Professor Clark S. Northup of Cornell University assumed the duties of editor. At Cornell the work was supported by funds from the Hecksher Foundation. In 1930, because of the aid which the Middle English Dictionary materials could furnish to the Early Modern English Dictionary and because of the obvious economy of doing both dictionaries at the same place, the Modern Language Association accepted the invitation of the University of Michigan and moved the Middle English Dictionary to Ann Arbor. Two representatives of the Modern Language Association, Professor Carleton Brown of New York University and Professor G. P. Krapp of Columbia University, and two representatives of the University of Michigan, Professors O. J. Campbell and C. C. Fries, then agreed upon an editor, and Professor Samuel Moore was invited to undertake the direction of the work. In September, 1934, Professor Samuel Moore died suddenly, and Professor Thomas A. Knott, who had been the general editor of *Webster's New International Dictionary* (2d ed., 1934) was called to the University to become the editor of the Middle English Dictionary.

The years from 1930 to 1936 were de-

voted to gathering the material necessary to complete the evidence upon which to base the editing. One hundred and eleven volunteer readers assisted the staff by copying out the quotations from Middle English texts, especially from those texts that have been made available in printed form since the first half of the *Oxford Dictionary* was published. In all, with the materials sent from Oxford, the slips gathered at Cornell, and those from the contribution of the volunteer readers and the staff at the University of Michigan, there are in the files of the Middle English Dictionary approximately one million quotations for the 45,000 vocabulary entries that will be necessary to represent the language of the Middle English period. From this material the Middle English Dictionary is continuing to make major changes in the recorded history of a large proportion of English words—the results of synthesizing all our knowledge of English life from 1100 to 1475. Such a new, well-focused, adequate Middle English Dictionary, utilizing all the published documents and resources, is needed not only by students of language and literature, but also by students of law, science, philosophy, history, and government.

From 1930 to 1937 this project at the University of Michigan was financed by funds supplied by the American Council of Learned Societies. The total support received from this source and from the research funds of the University of Michigan was approximately \$75,000.

CHARLES C. FRIES

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THE AVERY HOPWOOD AND JULE HOPWOOD PRIZES

WHEN Avery Hopwood was graduated from the University of Michigan in 1905 he left Ann Arbor with the desire to become a playwright. Throughout the years of his college life he had been interested in writing, and he was no doubt encouraged in his work by Professor Fred N. Scott, his teacher and his friend. Both Scott and Hopwood were active members of Quadrangle, the club that did more than any other at the time to discover and develop the creative capacities of students and faculty. Avery Hopwood's first play, entitled *Clothes*, was a serious drama written in collaboration with Channing Pollock. It was followed by a large number of dramas, most of them light farces, which made the name of Hopwood known not only in the United States, but also throughout the world wherever the play is looked upon as a source of entertainment.

The fact that his first play was a serious drama may indicate the depth of Avery Hopwood's interest in his writing. At least, one of his friends testifies that his failure to continue to write serious drama was always a source of regret to him. His farces, however, brought him the satisfaction of a large and steadily increasing income, until at the time of his death he was a millionaire. No one knows when he conceived the highly dramatic idea that resulted in the Hopwood awards, but one may surmise that

his own experience as a struggling young writer on the Michigan campus had something to do with his desire to make the path of the talented student an easier one to travel.

Upon his death in 1928 he left one-fifth of his large fortune to his alma mater with the proviso that the income from the bequest should be given away each year "to students . . . who perform the best creative work in the fields of dramatic writing, fiction, poetry, and the essay." The quotation is from his will.

The bequest amounted to \$351,069.78. From the income in the ten years ending in June, 1940, the University has given away in prizes for student writing over \$90,000. The prizes help to subsidize many talented young students during their years in college. In some instances the awards are large enough to give the students a year or more of leisure following graduation in which they may develop their capacities as writers (see also Part III: DEPARTMENT OF RHETORIC). Since the inauguration of the contests in 1931 sixty-three prizes of \$250 each have been awarded, two of \$300, two of \$350, three of \$400, eleven of \$500, seven of \$600, eight of \$700, eight of \$800, three of \$900, sixteen of \$1,000, two of \$1,200, two of \$1,250, one of \$1,300, twelve of \$1,500, one of \$2,000, and two of \$2,500. Thirty-six of these prizes are of \$1,000, or over. Nowhere else in the

world does a university offer such large prizes in the field of writing.

As an aid in the development of the students' capacities, courses in English composition are offered in the Department of English Language and Literature and in the Department of Journalism. These courses are so arranged that properly qualified students may, if they desire, work under direction every semester of their college course.

To add to the convenience of those planning to enter the contests, the committee in charge has opened the Hopwood Room. Here the students find current magazines, book reviews, critical journals, and a growing library of modern literature. Each month a few books fresh from the press are added to the collection. Here also, in a case by themselves and substantially bound, are all the manuscripts that have so far won awards.

As early as 1931 publishers began to be interested in the results of the Hopwood contests, and they are accepting prize-winning manuscripts in steadily increasing numbers. In the following list the date indicates the year in which the manuscript won an award, rather than the date of publication.

- Swamp Mud*, a play, by Harold Courlander (1931).
Whatever You Reap, poems, by Annemarie Persov (1932).
 "Books for the Dead," a play, by Hobert Skidmore (1933), in: *American and English One-Act Plays*, Vol. II.
Fireweed, a novel, by Mildred Walker Schemm, nom de plume, Mildred Walker (1933).
I Will Lift Up Mine Eyes, a novel, by Hubert Skidmore (1935).
Straw in the Wind, a novel, by Ruth Lininger Dobson (1936).
The Stubbard Way, a novel, by Baxter Hathaway (1936).

- The Well of Ararat*, a novel, by Emmanuel P. Menatsaganian, nom de plume, Emmanuel P. Varandyan (1937).
The King Pin, a novel, by Helen Finnegan Wilson (1938).
Lucien, a novel, by Vivian La Jeunesse Parsons (1938).
Fragments for America, poems, by Norman Rosten (1938). This volume, with additions of new poems, won the Yale Poetry Award for 1940 and is published in the Yale Series of Younger Poets.
Homeward to America, a volume of poems by John Ciardi (1939).
Heart-Shape in the Dust, a volume of poems by Robert E. Hayden (1940).
The Loon Feather, a novel, by Iola Fuller Goodspeed, nom de plume, Iola Fuller (1939).

Several of the writers mentioned above have continued to show evidence of productivity. Hubert Skidmore's fourth book, a juvenile entitled *Hill Doctor*, appeared in the summer of 1939. Ruth Lininger Dobson's second novel, *Today Is Enough*, appeared in 1939. Mildred Walker's fourth novel, *The Brewers' Big Horses*, appeared on August 8, 1940. Harold Courlander's second book, *Haiti Singing*, was published early in 1940.

The large awards are beginning to draw to the University young men and women for whom the art of writing is already one of the serious interests of life and for whom it may become a career. The Hopwood committee hopes that this movement will continue and that eventually the most talented young writers in the country, from freshmen to graduate students, will find their way here. As a result of Avery Hopwood's generous bequest the University should become the center for the development of talent in creative writing.

ROY W. COWDEN

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FINE ARTS

575

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3 DEPARTMENT OF FINE ARTS

he slow development of fine arts in other colleges, it is of interest that instruction in the fine arts was provided for in the very first act establishing the University of Michigan, namely, the Catholepistemiad act of August 26, 1817, prepared by Judge Woodward (see Part I: EARLY HISTORY). Under the professorship designated *oeconomica*, a department of the fine arts was provided for under the term *callitechnia*. This was much broader in scope than our traditional concept of such a department, since it envisaged the teaching of all those arts which "require the intervention of taste, genius, skill, a sense of beauty," including such subjects as naval architecture and typography.

In the "act to provide for the organization and government of the University of Michigan" passed by the legislature on March 18, 1837, a professorship of fine arts in the Department of Literature, Science, and the Arts was included among the thirteen professorships thereby created. The chair of fine arts was not among those occupied by any member of the first faculty when the University opened its doors in Ann Arbor in 1841.

The actual introduction of the teaching of fine arts at the University of Michigan is probably the quaintest on record; the minutes of several meetings of the Regents, starting with that of January,

1849, reveal an interesting story. Alvah Bradish (A.M. hon. '52), a portrait painter of Detroit, while on a visit to Jamaica, sent the University an alligator and some tropical fish, which were duly acknowledged by the Regents. In July, 1851, Mr. Bradish sent in a "memorial on the subject of a Professorship of Art." The Regents took no action upon it, and the memorial remained among unfinished business when President Henry Philip Tappan assumed office in 1852. In August of that year, Bradish was appointed Professor of the Theory and Practice of the Fine Arts, with no compensation, and was allowed "a room in the University buildings for reception of such specimens of art as may pertain to his Professorship." He offered no courses and had no duties, but evidently continued his painting of portraits in Detroit. In recognition of his services to the University, he was awarded an honorary master of arts degree in December, 1852. Six years passed. Some "specimens of art" had found their way to the campus, but evidently not to his room. Henry S. Frieze, Professor of the Latin Language and Literature, had begun the fine arts collection of the University in 1855, when he secured an appropriation from the Regents with which to purchase works of art in Europe. In 1858, while Frieze was busy compiling the first catalogue of this collection, Bradish petitioned the Presi-

dent to be allowed to deliver a course of fourteen lectures on the fine arts, offering the results of his studies. After much deliberation, the Regents grudgingly acceded to his request, voting him sixty-five dollars for "travel and board." The lectures were delivered, but Professor Bradish with some spirit returned the money. In 1861, the senior class asked that he be specially permitted to lecture to them—a recognition which he must have regarded as a triumph. The Regents allowed him \$250 for this service, but evidently regretted having done so, for they refused the request of the senior class of 1862 for a similar series of lectures. Finally, to prevent further requests of the kind, the nominal appointment of Alvah Bradish as Professor of the Theory and Practice of the Fine Arts was discontinued in August, 1863.

Henry S. Frieze had received his appointment as Professor of the Latin Language and Literature in the fall of 1854 and served the University for thirty-five years, part of the time as Acting President (see Part I: FRIEZE ADMINISTRATION). His broad cultural interests extended far beyond the limits of his professorship. In addition to beginning the art collection he brought about the establishment of the professorship of music in the University and led the movement to establish the Ann Arbor School of Music in the town. It was natural that he should introduce some teaching of the history of art into his classroom through his lectures on classical archaeology, which was akin to the history of art as it was then taught. Through him the taste for the fine arts was kept alive. Lectures on the history of Greek art were given to seniors in 1872, and by 1879 Martin L. D'Ooge and Henry S. Frieze were lecturing regularly on classical antiquities (see also Part IV: DEPARTMENT OF GREEK and DEPARTMENT OF LATIN). The first graduate seminar on Roman

archaeology was conducted in 1891 by Francis W. Kelsey, and the first graduate course in Greek antiquities by D'Ooge in 1892. A classical fellowship which included the study of archaeology had been established in 1889.

Thus did the courses in archaeology and history of art creep in under the wings of the Departments of Greek and Latin. In some colleges and universities it was then thought logical to give courses in Greek art and courses on the work of current excavations in Greek language departments. Aesthetics and even the history of art were taught in philosophy departments in some institutions, usually by the professor of "intellectual and moral" or of "mental and moral" philosophy. In 1892-93 the University of Michigan offered Aesthetics of Renaissance Art as a graduate course in the Department of Philosophy.

Up to that time, courses dealing with the history of art in some American universities had found their way to a permanent academic footing as an outgrowth from essentially practical art departments which at first had used the history courses only as a very general background. When courses in the history of art began to appear separately in college catalogues, professors of other subjects often served as teachers of the new subject. A survey of art in American colleges has revealed that even as late as 1912, eighty-three courses in the history of art, both undergraduate and graduate, were given in departments other than those of the history of art (Smith). Seventy-two of these, including courses in Christian archaeology, medieval and Renaissance art, and Italian painting, were given by classics departments, four by French departments, three by history, two by romance languages, and one each by Biblical literature and Semitic language departments. In 1931-32 there were some fifty graduate courses in the

history of art given under classical departments—many in colleges where recognized history of art or archaeology departments existed. In the establishment of departments of the history of art, the method of approach to the subject matter has varied. Mount Holyoke for many years announced that the historical development of art was to be traced philosophically; Vassar, Wellesley, and Washington University, among others, emphasized appreciation; Cornell announced in 1891-92 that the object of its department of classical archaeology and the history of art was "to place the student in a position to perform independent investigation." Wellesley, with Indiana, followed Harvard in including practical drawing courses as an aid to appreciation. Other colleges disagreed with this program, and the controversy as to whether or not historical courses are aided by practical courses continues an active one.

At the University of Michigan, sporadic instruction in drawing and painting had been available to those interested, both on and off the campus. Miss Alice Hunt in the early years of the present century conducted classes in drawing and painting. Her offerings were announced among the courses in the Department of Engineering, and she conducted private classes which were open to Ann Arbor residents. In 1906, the Department of Architecture was organized within the College (then known as Department) of Engineering, and it was affiliated with the Colleges (formerly Departments) of Engineering and Architecture until the College of Architecture became an independent unit in 1931.

The movement which finally achieved the establishment of the Department of Fine Arts in the College of Literature, Science, and the Arts owes much to the combined activities of those interested in both the practical and the historical-

theoretical aspects of the subject. Practical instruction in drawing and in ink and color rendering became a part of the curriculum in architecture; later, oil painting and architectural sculpture were added. Historical courses in architecture were included in the subjects required of the student preparing for a professional career in architecture.

The need for the re-establishment of the chair of fine arts in the Department of Literature, Science, and the Arts was recognized for many years. The Regents had been memorialized on the matter on several occasions before the proposal of September, 1910—signed by Professors D'Ooge, Kelsey, and Lorch, and Dean Cooley, and naming a candidate—led to the appointment of Herbert Richard Cross (Brown '00, Harvard '01, A.M. *ibid.* '02) as Assistant Professor of Fine Arts for 1911-12.

After his undergraduate and graduate work in the East, Cross, a New Englander, had completed his studies at the American School of Classical Studies in Rome. He had done practical work at the Rhode Island School of Design and had taught at Brown University, Wellesley College, the University of Illinois, and Washington University, St. Louis. The new Department of Fine Arts was housed in the recently completed Alumni Memorial Hall, and Cross also became the curator of the art collections.

The University *Calendar* for 1911-12 announced Italian Painting of the Fifteenth and Sixteenth Centuries for the first semester, and Roman and Medieval Art and Late Renaissance and Modern Painting in France, England, and America for the second, as well as an introductory course, given each semester, covering the history of architecture, sculpture, and painting from prehistoric times until the present. This program was developed during the eleven years of Professor Cross's administration of the

department to a specialization in the general field of the Renaissance and later periods, leaving the art of Greece and Rome, except as considered in the introductory course, to the courses in classical archaeology offered by the Departments of Greek and Latin.

Books for study and reference and lantern slides for the illustrated lectures were an immediate necessity. Through the years of his administration, Cross, as his budgets permitted, built up the equipment of the department. His main interest, however, was in his lectures, which presently became very popular with the undergraduates. He had an extraordinary command of English, which he used with telling effect. To him, the history of art was primarily a cultural and inspirational subject. He could become sincerely emotional over the Aphrodite of Melos, Chartres cathedral, or a Raphael madonna and could arouse, in many of his students, a genuine enthusiasm for his subject.

In July, 1912, Cross was promoted to a full professorship, which rank he held until his resignation in September, 1922. Though his interest lay primarily in undergraduate instruction, six graduate degrees in fine arts were granted during his administration, five master of arts degrees, and one degree of doctor of philosophy. In 1919 the staff of the department was enlarged by the appointment of Bruce McNaughton Donaldson (Princeton '13, A.M. *ibid.* '15) as Instructor in Fine Arts. In 1922, Cross was succeeded in the administration of the department by Donaldson. The previous experience of the new head of the department had been divided between curatorial and administrative work in two museums of art and university teaching. He had served as Assistant Curator in the Department of Decorative Arts and in the Department of Arms and Armor of the Metropolitan Museum of Art, New York, and,

later, had been appointed Assistant Director of the Albright Art Gallery, Buffalo Fine Arts Academy. From 1919 to 1922 he had taught courses on medieval and Renaissance architecture and sculpture in the University.

He regarded the problem at the University of Michigan as essentially an undergraduate problem,¹ and, with a definite plan of reorganization in mind, studied the program of courses and rearranged the material to suit better an enlarged curriculum. The character of the instruction was materially changed. The courses continued to be announced in the annual catalogues as fine arts, but the subject matter became the history of art. The collection of lantern slides was enlarged from about five thousand to approximately twenty-five thousand items in the years 1922-37.

Miss Adelaide Alice Adams ('20, A.M. '21), who had served for some years as Assistant and Teaching Assistant, was appointed Instructor in Fine Arts in 1924.

In October, 1928, the Carnegie Corporation of New York made a grant to the University of \$100,000, divided into five equal yearly payments, for the development of fine arts. Professor John G. Winter, of the Department of Latin, was appointed administrator of the fund and in January, 1929, was made, in addition to his other duties, Director of the Division of Fine Arts. The Director was placed in charge of graduate instruction in fine arts. In May, 1936, the title of the Division of Fine Arts was changed to Institute of Fine Arts (see Part VI: INSTITUTE OF FINE ARTS).

The general introductory course deals with the rise and development of the fine arts from prehistoric times to the Renais-

¹ Large numbers of students select one or more courses as free electives; a few concentrate in the field in the last two years. From 1922 to 1937, including summer sessions, there were more than 13,500 elections in courses in the Department of Fine Arts.

sance. A more detailed consideration of the Early Christian, Byzantine, Romanesque, and Gothic monuments is presented in two advanced courses. The Renaissance is studied in three courses: one in the Renaissance in Italy, one in the Renaissance in France, and one in the Renaissance in Spain and the Lowlands. An introductory course in Eastern art similar in purpose and character to the general introductory course in Western art is also available. The two remaining undergraduate courses cover American art and modern European art. These

courses offer the student the opportunity of including a cultural subject in his program of electives, and the completion of all these courses enables him to pursue graduate work with a preparation equal to the requirements of the graduate school of any American university.

BRUCE M. DONALDSON*

* Professor Donaldson died on January 12, 1940. The present professor of fine arts and chairman of the department is Harold Edwin Wetthey (Cornell '23, Ph.D. Harvard '34), who was appointed to the position in August, 1940, and came to the University upon the opening of the academic year.

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THE DEPARTMENT OF GEOGRAPHY

THE teaching of geography at the University of Michigan is of some years' standing. Geography started as a single course within the Department of Geology, acquired the status of a separate grouping of courses within that department, and finally embarked on a separate career. Since its inception the Department of Geography has had a distinct place in the development of the subject in the United States. Various members of the staff, former and present, have been among the leaders in geographical thought, each contributing to the advancement of some special phase or to the clarification of philosophical ideas within the field as a whole.

THE DEPARTMENT OF GEOLOGY.—In 1906, Professor William H. Hobbs came to the University of Michigan as head of the Department of Geology, following the death of Professor Israel C. Russell (see Part III: DEPARTMENT OF GEOLOGY). Professor Russell had already set the seal of approval upon geography by publishing a series of books on various aspects of the physical geography of the continent of North America. In 1895, *The Lakes of North America* appeared, followed in 1897 by *The Glaciers of North America* and *The Volcanoes of North America* and in 1898 by *The Rivers of North America*. In the early part of the twentieth century, the Appleton Company was issuing a series of regional studies of the world, and at the suggestion of Professor Richard E. Dodge of Columbia University, Professor Russell was asked to prepare a volume on North America. This volume, with the title *North America* (1904), was the first formal geographical treatment of the physical characteristics of the continent in one volume. Professor Hobbs came to

the University of Michigan with a record of noteworthy achievement in the realm of the physical aspects of geography, particularly in the study of glaciers. After a lapse of a few years, the first course in the nonphysical aspects of geography was offered in the Department of Geology in 1912-13, when Frank Carney, Acting Professor of Geology, gave a course entitled *Geographic Influences*, and a seminar, *Geographic Topics*. Irving Day Scott, then Assistant Professor of Physiographical Geology, gave a course entitled *General Geography* in 1914-15. He later developed courses in meteorology, but has remained with the Department of Geology, in which he now holds a full professorship.

THE DEPARTMENT OF GEOLOGY AND GEOGRAPHY.—In 1915-16, the Department of Geology became the Department of Geology and Geography, and Carl Ortwin Sauer (Central Wesleyan '08, Ph.D. Chicago '15) was called to teach geography exclusively, following the completion of special training in that subject for his doctor's degree. The division, or rather double-naming, of the Department of Geology and the coming of Sauer mark the real beginning of the teaching of geography at the University.

In 1916-17, the offerings in geography were enlarged. Scott gave a course in physiography, and Sauer offered *Commercial Geography*, *Geographic Influences in American History*, *General Geography—Influence of Environment on the Conditions and Activities of Men*, and *Geography of North America*. It is interesting to note that two of Sauer's courses dealt with "influences," in accordance with a tradition in American geography. In addition to the foregoing work, he introduced a type of course that

is important in any approach to the subject of geography, namely, a field course. With minor changes this array of studies continued for six or seven years. The World War brought a new course, Strategic Geography, which was described in the *Catalogue* as "a study of defences and of movement, engagement, and maintenance of armies." This was dropped shortly, but the work of the department was increased by field work which was introduced in the elementary general course, the *Catalogue* stating that there would be "excursions after Easter, Wednesday afternoons." Dr. Sauer also offered a course designed especially for teachers. Dr. Hobbs gave Topographic Map Reading in 1917-18, a course which was designed primarily for students who were "looking forward to military training."

The next important changes in the geographical branch of the Department of Geology and Geography were the coming of Kenneth Charles McMurry (Wisconsin '15, Ph.D. Chicago '21) from the University of Chicago and the establishment of the summer field camp in Kentucky in 1920 and the introduction of Sauer's course, Geography of Michigan, in 1921 (see p. 583). The course on the geography of Michigan, now carried on by Professor McMurry, was an important addition to the offerings in geography, for it was a forerunner of much of the land-planning work in the state and of the significant work of the Department of Geography in connection with that planning.

Darrell Haug Davis ('03) joined the geographical division of the Department of Geology and Geography in 1920 and taught for several years, first as an instructor and then as an assistant professor. In 1921-22 McMurry was teaching the Geography of South America and Sauer the Geography of the Settlement of America. In the following year Sauer

introduced another course of far-reaching significance—Land Utilization. This course, like the one on the geography of the state, helped in the formulation of guiding principles in studying the problems of the cutover lands of northern Michigan.

THE DEPARTMENT OF GEOGRAPHY.—Before 1923 instruction in geography had grown from a single course in the Department of Geology to fourteen semester and four summer courses given by three men, with a semi-independent status within the department. Then a radical change took place; the instruction in geography was organized as a separate department, effective with the academic year 1923-24. Sauer was called to head the newly created department at the University of California, D. H. Davis went to direct the geography department at the University of Minnesota, and Kenneth C. McMurry, who then held an assistant professorship, took over the administration of the new department at the University of Michigan. In addition, Preston Everett James (Harvard '20, Ph.D. Clark '23) came from his graduate studies at Clark University to accept a position as Instructor, and Robert Burnett Hall ('23, Ph.D. '27), a graduate student at Michigan, also became Instructor in Geography.

The department tentatively reduced its instruction in 1923 by omitting three courses which had been given by Professor Sauer—the Geography of Michigan, the Geography of the Settlement of America, and Land Utilization—although the descriptions of these courses continued to appear in the annual *Catalogue*. McMurry continued teaching the elementary course and James took over the course on South America, the study of a phase of that continent having been his specialty while working on the doctorate.

Hall and James were instructing in the elementary course, of which it was noted

in the *Catalogue*: "The first part of the course deals with the elements of the physical environment and the influences which these elements exert upon the life and activities of man." McMurry re-organized the course in land utilization, and it was given again. James taught a new course, *Climates of the World*, which formed the natural beginning of the development of another important phase in the geographical work at the University, for climate was coming to be recognized as the very base of a systematic approach to the study of geography.

The year 1925 marks a critical point in the development of geography in the United States, for in that year Professor Sauer published a kind of inaugural dissertation at the University of California, "The Morphology of Landscape." This article furnished a point of departure for many younger geographers, who were beginning to revolt against the rigid dogma of what has been called the "influence school." After that date there were important changes marking the acceptance of the new orientation, both in the general field of geographical study and within the department. At the University of Michigan Sauer had laid the foundation for much of the University's further development of geographical instruction, and at the University of California he issued a challenge to geographers in the United States which was not without weight in shaping the development of the study of geography in the department which had formerly claimed him.

Stanley Dalton Dodge (Chicago '22, Ph.D. *ibid.* '26) joined the staff of the department as an instructor in 1925. The word "influence" was omitted from the formal announcement of the introductory course. McMurry, who advanced to the full professorship in that year, revived the course on the geography of Michigan and inaugurated one on the geography of

North America. James, then an assistant professor, offered Tropical Geography, a course which was soon dropped.

The content of the introductory course reflected the effect of Sauer's article, "The Morphology of Landscape," upon the "geographical philosophy" of the department, the course description in the *Catalogue* of 1926-27 reading in part as follows: "This course deals with the character and distribution of the elements of geographic landscape." The study of "landscape" was spreading in the department, for in the same year Hall introduced the Geography of Asia, and Dodge, the Geography of Europe. A list of related courses in botany, business administration, economics, forestry, and geology in the *Catalogue* of the same year indicated that the Department of Geography was beginning to discover affinities with other departments. It seems to have been difficult to settle on a formula for the introductory course, for in the following year the announcement was worded anew: "This course provides an elementary knowledge and understanding of the areal distribution of man and his material works, and of the habitats wherein these works were evolved."

The difficulty in formulating a description of the content and purposes of the elementary course led the department to review the entire history of geography as a formal subject, from 600 B.C. to the present, and the course, *History of Geography*, by Dodge, was begun in 1928. In the next year he offered the *Distribution of Population* for the first time, laying the foundations for the fuller study of some of the "human" aspects of geography. Ideas germinating in the department were further advanced when, in 1931, Hall began a course named *Settlement* (the basis for much of the subsequent work in human geography) and James introduced the short-lived course, *Urban Geography*.

GEOGRAPHY SUMMER FIELD STATION.—In the summer of 1920 the Summer Field Station was established at Mill Springs, Kentucky, where field courses in geology were also given. The camp was under the direction of C. O. Sauer in the years 1920-23 inclusive, and then of George M. Ehlers, of the Department of Geology, through 1935, when the Kentucky station was discontinued. During the sixteen years several members of the geography staff, with their assistants, took large numbers of students into the field for preliminary training in field geography. McMurry, James, and Hall, with the assistance of Kendall, Davis, and others, organized the field work after the first years, during which it was in the hands of C. O. Sauer. Since 1935, the geography field work has been carried on in summer camps in the northern part of Michigan, under the direction of McMurry and with the assistance of Charles M. Davis.

PRESENT STAFF, AND RESEARCH.—In 1940 the personnel of the department, in addition to Professors McMurry, James, and Hall and Associate Professor Dodge, included Assistant Professors Henry Madison Kendall (Amherst '24, Ph.D. Michigan '33) and Charles Moler Davis

('25, Ph.D. '35). McMurry has continued his work in land utilization, and is now recognized as one of the leading authorities on the study of geography as a necessary basis for any practicable plan for the proper utilization of the land. James, specializing in the geography of South America, has become a leading authority in that field. Hall, with interests centered in the study of the geography of Japan, has received wide recognition for his intensive studies of Japanese settlements, and Dodge has continued his studies of the geographic aspects of population and is receiving recognition for them. Kendall has carried on field work in France and Belgium and has been widely recognized for some of his climatic studies, and Davis is continuing field studies in Colorado on the basis of the successful completion of a preliminary study of a small section of the Rocky Mountains. Along the lines indicated by the principal activities listed above the Department of Geography has settled down to a service of usefulness in the study of the various aspects of the "landscape" of the world and of its significance in the solution of problems of interest to man.

STANLEY D. DODGE

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THE DEPARTMENT OF GEOLOGY

I. THE DEPARTMENT OF GEOLOGY BEFORE 1906

THE Department of Geology is, as regards the time of its founding, one of the oldest departments in the University, for as early as October, 1839, the Regents appointed as Professor of Geology and Mineralogy Douglass Houghton (A.M. and M.D. Rensselaer Polytechnic Institute '29), a geologist of distinction and an outstanding personality. The appointment was made without salary stated, and service was to begin when his work for the state survey of Michigan, on which he was then engaged, should be concluded.

Although in the first printed list of the faculty his name comes second, immediately after that of Asa Gray, Professor of Botany, yet, like Gray, he never actually taught classes in the University, for on October 13, 1845, with his survey work still uncompleted, he was drowned on a Mackinaw boat during a storm on Lake Superior.

About a year before Dr. Houghton's death the Board of Regents appointed an assistant to him in the person of Silas Hamilton Douglass (A.M. hon. Vermont '47). Houghton's unoccupied chair was at this time the professorship of chemistry, mineralogy, and geology, and Douglass was an assistant to the Professor of Chemistry. It is not clear just when the actual teaching work in geology was started, for Douglass' primary interest was throughout in chemistry. Douglass' title was many times expanded. In 1845-46 he was Lecturer in Chemistry and Geology; in 1846-47, Professor of Chemistry and Geology; in 1847-48, Professor of Chemistry, Mineralogy, and Geology; in 1850-51, Professor of Chemistry, Pharmacy, and

Medical Jurisprudence; in 1851-52, Professor of Chemistry, Pharmacy, Medical Jurisprudence, Geology, and Mineralogy. Whatever the title, chemistry appears to have absorbed the greater part of his attention (see Part III: DEPARTMENT OF CHEMISTRY). After 1855, when his connection with the professorship of geology ceased, he became Professor of Chemistry, Mineralogy, Pharmacy, and Toxicology.

Throughout the decade that Douglass conducted the work in geology, it seems to have been restricted to a single three-hour course offered in the last term of the senior year. In 1855 Alexander Winchell (Wesleyan '47, LL.D. *ibid.* '67), who had been appointed Professor of Physics and Civil Engineering in November, 1853, and had taken up his duties in the University in January, 1854, was transferred to a newly formed chair of natural history. At this time his training had been in mathematics, and his geological experience had been limited to the collecting of fossils in the South with Professor M. Tuomey of the University of Alabama. Since the natural history work occupied a portion only of his time, Winchell taught also elementary mathematics and served as Secretary pro tem of the Board of Regents, though this position he resigned in 1856. In 1859 he was appointed state geologist of Michigan for one year and in 1869 again for two years. In 1859, when he received from the survey a salary of \$1,000 for six months' work (Merrill, p. 207), he requested of the Board of Regents the appointment of an assistant to take over his teaching for these months, and the request was granted, though he retained his full University salary.

Although the training in geology of

Dr. Winchell was very deficient, he was a man of remarkable capacity for work, and while he continued to lecture and write on many subjects outside his field of teaching, he eventually became widely recognized as a leader in geological science. The Geological Society of America was founded in 1890, and in 1891 Winchell was elected the second president of the Society in immediate succession to Professor James D. Dana of Yale University. He was an orator of great power, and his lectures to classes reflected this ability rather more than instructional quality. Filibert Roth ('90), former head of the Department of Forestry, was a student in Professor Winchell's classes, and once related to the author that Professor Winchell would enter the classroom, open his text at random, and, his eye alighting upon some word, would make this the text of his lecture. Soon quite absorbed in abstraction, he would be oblivious to the fact that students were slipping away, some by the door and others by the windows. He was also subject to moods in his contacts with students. Harry B. Hutchins ('71, LL.D. '21), afterwards President of the University, related how he went to Professor Winchell and expressed a desire to prepare for a geological career. Winchell was in a happy mood and mapped out the work, so that Hutchins went away enthusiastic. When Hutchins next saw his professor, Winchell's mood had changed, the incident of the earlier meeting had been forgotten, and the student was discouraged from such a course. "So near," said President Hutchins, "did I come to the career of a geologist."

In 1865 a two-year curriculum in mining engineering was offered (*R.P.*, 1864-70, p. 108), and a few students in that field were later actually graduated. In 1875 the state legislature was memorialized and passed an act to provide for a School of Mines to be located at the Uni-

versity, with professors of mining engineering, metallurgy, and architecture and design, together "with the necessary assistant instructors." The sum of \$8,000 was appropriated for salaries and \$2,500 for equipment for each of the two years 1875-76 and 1876-77. William Henry Pettee (Harvard '61) was appointed Professor of Mining Engineering, and Silas H. Douglas,¹ Professor of Metallurgy. Financial support was not continued beyond this two-year period, and though Pettee and Douglas gave the courses for two more years, the project was then given up. The lack of continued support from the legislature was due in part to the rivalry between the Upper and Lower Peninsulas of the state, and in part to the lack of confidence in the University, and especially in its Professor of Metallurgy, occasioned by the Douglas-Rose scandal within the Department of Chemistry (see Part I: DOUGLAS-ROSE CONTROVERSY). A School of Mines was located in 1885 at Houghton in the Upper Peninsula.

Almost from his arrival at the University in 1854, Dr. Winchell became involved in a bitter controversy with Dr. Tappan, the President, and was charged by the latter with attempts to oppose his authority and obstruct his policies.

In 1873 Dr. Winchell accepted a call to the chancellorship of Syracuse University. Three years before his departure, that is, in the summer of 1870, Mark Walrod Harrington ('68, A.M. '71, LL.D. '94) had been appointed Instructor in Mathematics and Assistant Curator of the Museum of Natural History, but with the title changed in June, 1872, to Instructor in Geology, Zoology, and Botany. When Winchell departed for Syracuse the Regents called to his chair Eugene Woldemar Hilgard (Ph.D. Heidelberg '53) from the University of Mississippi. His title was Pro-

The name was spelled in this fashion after 1873.

fessor of Geology, Zoology, and Botany. Harrington was at the same time promoted to the rank of assistant professor in the same three departments. Thus, for the first time at the University, the Department of Geology was provided with a staff of two who were making it their special line of teaching. This earnest of a stronger department was to prove disappointing, for the next year Harrington was transferred to the Department of Zoology and Botany, and Hilgard himself within two years had accepted a call to the University of California.

For the two years 1875-77 the chair of geology was to remain vacant. In the meantime Pettee continued as Professor of Mining Engineering, and though Joseph B. Steere was made Assistant Professor of Paleontology in 1876, he did no teaching in geological science. In 1877 the Regents appointed Dr. Pettee Professor of Geology in charge of Mining Engineering, and for the next two years he was to conduct the mining engineering work.

In 1879 Dr. Winchell was called back to the University as Professor of Historic Geology and Paleontology, and the title of Dr. Pettee was then changed to Professor of Mineralogy and Economic Geology. Winchell's title the following year was changed to Professor of Geology and Paleontology, and this chair he held until his death at Ann Arbor on February 19, 1891. Professor Pettee had continued to give courses in economic geology and in the geology of the United States. Thus, for the second time, the department included more than one teacher. Winchell gave a course in elements of general geology (lectures two hours weekly and oral exercises one hour additional) throughout the year; one in paleontological investigations (three to five hours weekly) throughout the year; the teachers' course in the elements of geology (two hours weekly), and a course

in mining engineering (five hours weekly) throughout one semester.

When Winchell died in February, 1891, William Hittell Sherzer ('89, Ph.D. '01) was teaching at Houghton. He was called as Instructor in Geology and taught the geology courses for the three months still remaining. At the June meeting of the Board of Regents he was reappointed with the same title for the year following (1891-92). He introduced two new courses: Macroscopic Petrography and Microscopical Mineralogy and Petrography.

In May, 1892, Israel Cook Russell (C.E. New York University '72, LL.B. *ibid.* '97) was called to succeed Professor Winchell, with the title of Professor of Geology. At first he offered but three courses: Elements of Geology (a three-hour course throughout the year), Physical and Glacial Geology (a three-hour course), for one semester, and Paleontology, likewise a three-hour course for one semester. Later he offered four courses each semester, but most of these were not given, and, in fact, could hardly have been given satisfactorily by a one-man department without even an assistant.

WILLIAM H. HOBBS

II. THE DEPARTMENT OF GEOLOGY FROM 1906 TO 1940

During the second semester of 1905-6 Professor Russell died, and in the late summer William Herbert Hobbs (Worcester Polytechnic Institute '83, D.Eng. *ibid.* '29, Ph.D. Johns Hopkins '88, LL.D. Michigan '39) was appointed Professor of Geology and Director of the Geological Laboratory in the University. With his appointment there began a very notable expansion of the work in geology. When he entered upon his office the department occupied two rooms in the attic of the old Museum Building (now the Romance Language Building) with an exhibition room and a share, with other

departments, in the lecture room on the first floor of the building. During the year Irving Day Scott (A.B. Oberlin '00, Pd.B. Albany State Normal '01, Ph.D. Michigan '12), who was then pursuing his work in the department and was afterward advanced through the several grades to become Professor of Physiological Geology in 1930, was appointed as an assistant. At the Regents' meeting of September, 1907, Ermine Cowles Case (Kansas '93, Ph.D. Chicago '96) was appointed Assistant Professor of Historical Geology and Paleontology, and in succeeding years instructors were added to the department to teach other branches of the science.

In the year 1905-6, 131 students had been enrolled in the department. When Professor Hobbs retired, in 1933-34, there were ten members of the instructional staff, including two professors, three associate professors, four assistant professors, and one instructor, with a number of assistants, and the enrollment of students in the department was 1,035, of which number seventeen were in the Graduate School. The department had taken over ample quarters for its work in 1915 in the new Natural Science Building.

In 1907 Irving D. Scott was appointed Instructor in Geology. He developed courses in physiography, including Meteorology. He also conducted large freshman classes in introductory geology and in 1935 took charge of the work in physical geology.

Rolland Craten Allen (Wisconsin '05, A.M. *ibid.* '08) was appointed Instructor in Geology to develop the work in economic geology in 1908, and this work he carried on for a year and then became state geologist of Michigan, but he continued to give lectures on certain special phases of economic geology until 1913.

To find room for the expanding de-

partment within the antiquated Museum Building the geological collections upon the first floor were crowded closer together, and a part of the space was converted into a laboratory for the students. Small offices were also found for some of the staff in this room.

In 1908 Frank Leverett (Iowa State College of Agriculture and Mechanic Arts '85, Sc.D. hon. Michigan '30), distinguished glacial geologist and long a member of the United States Geological Survey, was appointed to the staff as Lecturer in Glacial Geology, and in that capacity he conducted lectures and took charge of excursions until 1928, when he retired from the department.

Up to the year 1906, or during the first sixty-seven years of the history of the Department of Geology at the University, the instruction in geology was carried on either entirely by one professor, other departments sometimes utilizing a part of his time, or, for brief intervals (1871-73 and 1879-91), by two men of whom one gave full time to it and the other only part time. During Professor Russell's incumbency, which terminated with his death in 1906, he labored without assistance.

In the study of geology at the University of Michigan there is imposed a certain heavy handicap in the fact that all save the latest of geological formations are buried deep under glacial deposits. The rocks of the earth constitute a large part of the equipment of any geological laboratory, and to find them exposed one must go far from the University. Even some of the simplest of geological processes are illustrated in the vicinity only by abnormal examples. This handicap has been met in part for the elementary courses by extended excursions and by newly devised laboratory apparatus. For the advanced students the handicap is particularly serious, for they must undertake their individual

studies of geological problems by time-consuming and extended journeys to somewhat remote areas.

The instructional work within the growing department was organized upon a plan to meet the needs of different classes of students. There were, first, general introductory courses which constituted a part of the liberal education, for the freshmen and for upperclassmen, the latter course conducted by the head of the department and required for certain groups of engineering students and for all forestry students. There were courses for teachers of earth science in secondary schools. To meet the needs of students who were planning to take up economic geology, an intensive undergraduate course was provided with curriculums arranged at some sacrifice of cultural courses, but with concentration on special lines of economic geology, particularly oil geology and geology of the metals and nonmetals. Graduates in these curriculums were given a special certificate in geology and have been very successful in obtaining positions, particularly in the large field of oil geology. Built upon the introductory courses of the department were the advanced courses for the training of professional geologists in the several fields of structural, dynamical, glacial, and economic geology and paleontology.

After the resignation of R. C. Allen in 1909, Charles Wilford Cook ('04, Ph.D. '13), who had been acting as an assistant in the Department of Mineralogy, was appointed to carry on the work in economic geology. He advanced to the rank of professor in 1925 and was especially successful in training men within his field, as clearly shown by the positions they have occupied. His lamented death occurred in 1933.

In 1919 George Marion Ehlers ('13, Ph.D. '30) joined the staff as Instructor and gave special aid in the assembling

and care of the geological collections, as well as in developing courses of instruction in invertebrate paleontology. His advancement to his present rank, the associate professorship, came in 1934.

Up to the year 1912 the subject of geography had not been taught in the University. However, as the need for such work became increasingly apparent, Carl Ottwin Sauer (Central Wesleyan '08, Ph.D. Chicago '15) was appointed to the staff of the Department of Geology in 1916. The name of the department was at the same time changed to the Department of Geology and Geography. Having been promoted in 1918 and again in 1920, Sauer was appointed to a full professorship of geography in 1922. Kenneth Charles McMurtry (Wisconsin '15, Ph.D. Chicago '21) was added to the staff as Instructor in Geography in 1920 and was made Assistant Professor in 1921. In 1923 Preston Everett James (Harvard '20, Ph.D. Clark '23) was added to the staff as Instructor in Geography, and in the same year, when Professor Sauer resigned, Dr. McMurtry became acting head of the newly organized Department of Geography, made up of all the geography work previously under the joint Department of Geology and Geography (see Part III: DEPARTMENT OF GEOGRAPHY).

To secure for all students of the Department of Geology and Geography that important field training which is a first essential, a Summer Field Course in camp was established in 1920 at Mill Springs, Kentucky, with Case in charge of the courses in geology and Sauer in charge of those in geography. Sauer was in 1920 appointed director of the camp. In the next year George M. Ehlers took charge of the courses in geology, and in 1924 he became director of the camp in place of Professor Sauer. In 1924 Irving D. Scott took charge of the courses in physical geology at the camp and for

many years thereafter conducted the work. The Summer Field Course was continued in connection with the Department of Geography at the Mill Springs station in Kentucky until the summer of 1936, when the camp was divided. At this time the Geology Field Course was established at State Bridge, Colorado, with Ehlers as director and with Belknap and Eardley added to the staff of instruction.

Russell Claudius Hussey ('11, Ph.D. '25), Associate Professor of Geology since 1931, became a member of the instructional staff of the department in 1921 to teach general and historical geology. After 1929 he carried the courses in historical geology independently and developed an introductory course in paleontology. From 1931 to 1936 Hussey served as Assistant to the Dean of the College of Literature, Science, and the Arts, in an advisory capacity to students, though continuing a part of his work in the Department of Geology. He also developed strong courses in the extension work of the University.

It was in 1921 that Laurence McKinley Gould ('21, Sc.D. '25) was appointed Instructor in General Geology, and he was an associate professor at the time of his resignation in 1932; his last four years were spent on leave in connection with exploring expeditions, the latest that of the first Byrd antarctic expedition. In 1932 he became Professor of Geology and Geography at Carleton College, Northfield, Minnesota.

Miss Ellen Burden Stevenson ('20, M.S. '30), later Mrs. George M. Stanley, entered the department in 1923 as Instructor in Geology, was raised to an assistant professorship in 1931, and resigned to take up other work in the University in 1933. For a considerable time preceding this retirement from the department she had given but half time to her geological work.

In 1924 Walter A. Ver Wiebe (Cornell '13, Ph.D. *ibid.* '18) was made Instructor in General Geology, and retained this position until 1927, when he resigned to become Professor of Geology in the Municipal University at Wichita, Kansas. Ralph Leroy Belknap ('23e, Sc.D. '29), who joined the department in 1923 as Instructor and has been Associate Professor since 1939, has devoted his time to general geology, and especially to geological field surveying. Lewis Burnett Kellum (Johns Hopkins '19, Ph.D. *ibid.* '24) was in 1928 appointed Instructor in Paleontology and Petroleum Geology. His work in Mexico previous to his appointment had directed his attention to the structural problems there, and he returned during the summers for successive years, either alone or with colleagues and assistants from this or other universities. He attained his present rank of associate professor in 1937.

In 1928 the University Museums Building was completed, and the collections of fossils were moved to that building. Those members of the staff directly connected with paleontology were given quarters in the new building, which left much-needed space in the Natural Science Building. With this additional space and with new facilities it became possible to provide long-needed instruction in paleobotany, and Chester Arthur Arnold (Cornell '24, Ph.D. *ibid.* '29) took charge of this work, dividing his time between the Museum of Paleontology and the Department of Botany.

In the planning of the Natural Science Building, provision had been made for instruction in soil geology, and in 1927 Maurice William Stenius (M.S. '19, Sc.D. '28) took charge of that work and was later advanced to Assistant Professor. In 1930 Armand John Eardley (Utah '27, Ph.D. Princeton '30) was appointed Instructor to teach some of the courses in general and economic geology

during Gould's absence in the antarctic. Upon the latter's resignation in 1932 Eardley became a permanent member of the staff, with his work largely in the field of structural geology. He has held an associate professorship since 1939. It was in 1930 also that George Mahon Stanley ('28 ϵ , Ph.D. '32) was appointed Instructor in General Geology, to continue certain courses in glacial geology formerly taught by Leverett.

In 1934, when he reached the compulsory retirement age of seventy years, Hobbs was made Professor Emeritus of Geology and was succeeded by Case as head of the department. The same year Thomas Seward Lovering (E.M. Minnesota '22, Ph.D. *ibid.* '24) was appointed to take charge of economic geology, work in which had been carried by other members of the staff since the death of Cook in 1933.

Extensive graduate work within the department has been carried on only within the last thirty years. Up to 1906, when the period opened, but two master's degrees and two of the doctorate of philosophy had been conferred—one of the latter on Mary E. Holmes in 1887 and the other on W. H. Sherzer in 1901. Even after the expansion had begun, it was of necessity a considerable number of years before the degrees could be conferred upon those who had been working in the department. Within this period and for some years thereafter, or until the department included a fair number of mature scholars, students were quite generally advised to continue beyond the master's degree at the better-equipped universities elsewhere. From the beginning, however, the degree of master of science or master of arts within the department was given only after a considerable amount of graduate work and upon completion of a thesis approved by the department. These theses in many cases have been of such value as

to warrant their publication as definite contributions to the science.

ERMINE C. CASE

III. RESEARCH AND EXPLORATION

Of scholarship there has been no lack among the occupants of the chair of geology. Dr. Houghton, who, although he did no regular teaching, contributed to the geological collections and was a distinguished geologist of the pioneer period.

Dr. Winchell, though he had come to the University without training in geology and was probably better known through his lectures and writings as an orator and a great popularizer of science, contributed in important ways to the geology of the state. When state geologist, he worked out the basin structure of the Paleozoic formations of the Lower Peninsula and the stratigraphy of the Marshall group of the Mississippian. To the geological journals he contributed articles on more general problems of the science. His published books and papers make up a list of titles which covers thirteen pages; the wide range of topics includes education, religion, and administration.

His better-known books were *Pre-adamites* (1880), *Sparks from a Geologist's Hammer* (1881), *World Life* (1883), and *Walks and Talks in the Geological Field* (1886). Winchell's writings and lectures, more than those of any other representative of science in America, were responsible for the growing liberality of thought toward the great doctrine of evolution.

It is probably not widely known that Dr. Winchell started the regular recording of daily meteorological observations at the University of Michigan, a pioneer in this respect for the country. Winchell's series, begun in New York in 1848, were reported to the Smithsonian Institution in Washington. In 1854 his request to the Regents was approved to make these observations regularly at the Uni-

versity with his own instruments (*R.P.*, 1837-64, p. 575).

Mark Walrod Harrington, Instructor in Geology, Zoology, and Botany in 1872, became in 1879 Director of the Detroit Observatory at the University and started its series of meteorological observations, founded the *American Meteorological Journal* in 1884, and became Chief of the United States Weather Bureau in 1892 (see Part III: METEOROLOGICAL INSTRUMENTS AND THE TEACHING OF METEOROLOGY).

Hilgard, who had held the chair of geology from 1873 to 1875, had, in contrast to Winchell, gone through a rigorous technical training and held an earned degree of doctor of philosophy. He thus represented somewhat more of the solid reputation in scholarship. A specialist in soils, his complete bibliography is very extensive, and includes 243 titles. This pre-eminence in scholarship was recognized by the conferment of the honorary degree of doctor of laws by the Universities of Mississippi, Michigan, Columbia, and California, by a gold medal from the Academy of Sciences in Munich, and by election to the National Academy of Sciences.

Russell, who succeeded Winchell in 1892, was a pioneer explorer-geologist of the Great Basin region of the West; he became a specialist of wide reputation on glaciers and was the author of a wide range of semipopular books on *North American Lakes* (1895), *Glaciers* (1897), *Volcanoes* (1897), *Rivers* (1898), and on *North America with Reference to Its Geography* (1904). His *Quaternary History of Lake Lahontan*, published by the United States Geological Survey, is a quarto monograph of 288 pages and forty-four plates, and his correlation paper on the Newark System, also issued by the United States Geological Survey, is a comprehensive monographic report of 344 pages.

He was in 1906 elected president of the Geological Society of America. His published papers number 122. He led two scientific and climbing expeditions to Mount Saint Elias, arrived near its summit on the second expedition, and pointed out the route to the Duke of Abruzzi, who finally succeeded in reaching the summit. In the exploring field Dr. Russell was a member of the Transit of Venus expedition of 1874 to New Zealand and Kerguelen Island in the Antarctic; in 1878 he took part in the government surveys west of the one-hundredth meridian (Wheeler Survey), in 1880-83 in surveys of the Great Basin region for the United States Geological Survey, from 1885 to 1888 in studies of the southern Appalachians, and in 1889 in exploring work for the United States Coast and Geodetic Survey along the northeastern boundary of Alaska. In 1902, after the grand eruption of Mount Pelée, he went with the National Geographic Society's expedition to the scene of the disaster.

The research work of Professor Hobbs before coming to the University was largely in the field of structural geology and petrography, with nearly a score of field seasons in western New England for the United States Geological Survey. After entering upon his duties at the University it has been within the field of dynamical geology, with emphasis on earthquakes, glaciers, and atmospheric circulation in its relation to continental glaciers. He has published four treatises: *Earthquakes* (1907), *Existing Glaciers* (1911), *Earth Evolution* (1921), and *The Glacial Anti-cyclones* (1926); a textbook, *Earth Features* (1912 and 1931); two narratives of exploration, *Cruises Along By-Ways of the Pacific* (1923) and *Exploring About the North Pole of the Winds* (1930); a war history, *The World War and Its Consequences*, with an introduction by Theodore Roosevelt (1918); three biographical works, *Leonard Wood* (1920),

Peary (1936), and *Explorers of the Antarctic* (1941); and also government and other reports and monographs. His published papers number 264 titles. Hobbs was in 1922 exchange professor at the University of Delft and in 1931 Russel lecturer at the University of Michigan (see Part II: RESEARCH CLUB). He is a member of the American Philosophical Society. He organized and led three scientific expeditions to Greenland from the University in 1926, 1927-28, and 1928-29, and was director of another in 1930—all chiefly for the study of glacial and meteorological conditions.

Professor Case has done his principal research work in the field of vertebrate paleontology, which has required collection of the material on exploring trips in various areas of the western United States. In all, no less than thirty of these arduous collecting expeditions have been carried through, and in 1923 he traveled throughout the world for study of Permian areas. Professor Case is today an authority on the vertebrate life of the Permian and Triassic ages. The published material has been brought out in eight monographs by the Carnegie Institution of Washington. These have been: No. 55, *Revision of the Pelycosauria*; No. 145, *Revision of the Cotylosauria*; No. 146, *Revision of the Amphibia and Pisces of the Permian*; No. 181, *Permo-Carboniferous Vertebrates of New Mexico*; No. 207, *The Permo-Carboniferous Red Beds*; No. 283, *Environment of Vertebrate Life in the Late Paleozoic*; No. 321, *New Reptiles and Stegocephalians from the Upper Triassic*; and No. 375, *Environment of Tetrapod Life in the Late Paleozoic of Regions Other than North America*. His published papers are represented by 144 titles. He is a member of the American Philosophical Society and was Russel lecturer at the University in 1934. He was in 1929 president of the Paleontological Society of America.

Frank Leverett, for a score of years

(1908-28) Lecturer on Glacial Geology, is an outstanding authority on the Pleistocene glaciology of North America. This has been recognized by his election to the American Philosophical Society and to the National Academy of Science and by the conferment upon him of the honorary degree of doctor of science by the University of Michigan in 1930. His greater monographs, all published by the United States Geological Survey, include *The Illinois Glacial Lobe* (1899), *Glacial Formations and Drainage Features of the Erie and Ohio Basins* (1902), and (with Frank Taylor) *The Pleistocene of Indiana and Michigan and the History of the Great Lakes* (1915). His published papers number 170 titles.

Charles Wilford Cook (1908-33), Professor of Economic Geology, was a specialist on deposits of salt, oil, gas, and molybdenum minerals and published some nineteen scientific papers.

Laurence McK. Gould (1921-32), Instructor, Assistant Professor, and Associate Professor in the department, has played an important part in scientific exploration. He was geologist and second-in-command of the first University of Michigan Greenland expedition (1926), geographer and topographer and second-in-command of the Putnam arctic expedition (1927), and senior scientist and second-in-command of the first Byrd antarctic expedition (1928-30).

Lewis B. Kellum, Associate Professor of Paleontology (1928—), has directed six scientific expeditions to Mexico in the years 1930 to 1935. They have been devoted to a geological study of eastern Durango, southern and southwestern Coahuila, the San Carlos Mountains, and northern Zacatecas. The expeditions have been financed by grants from the National Research Council, the Geological Society of America, and the University of Michigan. Geologists from the facul-

ties of Chicago, Johns Hopkins, Michigan, and Rochester universities, and Michigan State, Rutgers, and Texas Technological College have taken part in these expeditions. Kellum's most important contributions are: "Paleontology and Stratigraphy of the Castle Hayne and Trent Marls in North Carolina" and "Evolution of the Coahuila Peninsula, Mexico."

Ralph L. Belknap, Associate Professor of Geology (1923—), has made four expeditions to Greenland, all sponsored by the University of Michigan. He was a member of the first expedition (1926), in charge of surveys, second-in-command of the second (1927) and third (1928) expeditions in like capacity, and he led the Michigan-Pan-American expedition to northwest Greenland in 1932.

Irving D. Scott, Professor of Physio-graphical Geology (1906—), is a specialist in the study of lakes and of dune formations. His scientific papers comprise eleven titles.

George M. Ehlers, Associate Professor of Geology (1914—), has specialized in Paleozoic paleontology and is credited with sixteen scientific papers.

Thomas S. Lovering, Associate Professor of Economic Geology (1934—), has studied especially the rocks of the Rocky Mountains in Colorado, structurally and with regard to the ore deposits. His published papers number twenty-nine titles. The most important are: "Geology and Ore Deposits of the Breckenridge Mining District, Colorado," and "Theory of Heat Conduction Applied to Geologic Problems."

In view of the importance of the mineral deposits in the Upper Penin-

sula of the state, early made known by Douglass Houghton, the small development of the geological sciences at the University during its first half century is remarkable. For this there are several causes. A lack of confidence arose out of the Douglas-Rose scandal within the Department of Chemistry, for Douglas was in charge of all the geological work for the first ten years and for an even longer time for the work in mineralogy. However, the rivalry between the two peninsulas of the state and the location of the mineral deposits within the Upper Peninsula developed a local pride which was only satisfied when the School of Mines was finally established at Houghton, more than forty years after the founding of the University. This, as well as the location of the State College of Agriculture at the state capital, caused a division of state appropriations and a diversion of federal support when the Morrill Act was passed in 1865.¹ The needless triplication of personnel and laboratory equipment which these unwise decisions of the state legislature brought about, greatly handicapped Michigan and Iowa, which had much the same experience, among the state universities.

WILLIAM H. HOBBS

¹ The Civil War between the states had shown the country's need in such a national emergency for men of education trained to take command in regimental positions. To encourage such training Congress at the conclusion of the war provided by the Morrill Act for the services of an army officer and a grant of \$30,000 annually to one college in each state, with the proviso that the college include courses in engineering and mechanic arts and would in addition provide compulsory courses in military training for all its students during their first two years of attendance. For Michigan this grant went to the Michigan Agricultural College at East Lansing, now the Michigan State College of Agriculture and Applied Science.

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THE DEPARTMENT OF GERMANIC LANGUAGES AND LITERATURES

AMONG American institutions the University of Michigan has always been prominent in the cultivation of the German language. It was early recognized that German ranked in cultural and practical value with the classical languages, and it came to be considered almost axiomatic that some knowledge of the language was necessary for every well-educated person. Until the time of World War I the enrollment in German was larger than that in any of the other modern languages, and, under the direction of a long succession of able and enthusiastic teachers, it exerted a powerful influence upon the educational program of the state.

The first evidence of any interest in modern languages in the University of Michigan is afforded by the appearance of the name of Louis Fasquelle, Professor of Modern Languages, in the *Catalogue* of the year 1846-47. During his first two years on the faculty his teaching was confined to one course in French. It was only one-third of a year long (one term), but was ordinarily required for graduation, as were all the courses listed. There were then no electives indicated, or even alternative curriculums. The French course was extended to two terms in 1848-49, at which time, according to the *Catalogue*, one term of Spanish and one of Italian were also taught. The latter two courses were replaced by German in the fall of 1849. That this pioneer work before 1850 was highly esteemed, however slight it may now seem, is to be seen from the Regents' annual report to the superintendent of public instruction for 1849:

It deserves to be particularly noticed, that they [the Regents] have introduced a system

of extensive and efficient study in Modern Languages, running through the whole course, which will make all students acquainted with most of the modern languages of Continental Europe, and particularly the French, Spanish, Italian, and German. In Eastern Colleges, the Modern Languages are but an incidental study, during one or two terms of certain classes; and that, by students only who may elect them in preference to other branches. In this respect, our University possesses superior privileges; and meets, more extensively and efficiently, the wants of our educated youth, than any of our older Colleges. It is a new feature in College studies, and particularly appropriate to our Western States, filling up with a foreign population from nearly all the different nations of Europe. (*R.S.P.I.*, 1849, pp. 34-35.)

It may well be doubted that this exactly represented the situation, however, for in our own time it is only a very exceptional student who acquires much knowledge of a foreign language in two-thirds of a year, and the catalogues do not confirm the statement that instruction in modern languages ran "through the whole course."

LOUIS FASQUELLE, 1849-62.—In 1849-50, when German made its appearance, the total amount of modern language work was comprised in two terms of German (junior year) and two terms of French (one term in the sophomore and the other in the junior year). Spanish and Italian were not offered again for nearly twenty years.

The increasing recognition of the importance of scientific studies led in 1852 to the introduction of a scientific course. Three terms each (an entire year) of French and German were required, and students in the classical course were also

obliged to offer three terms of French, but only two of German. The more informative *Catalogue* of that year tells us what was done in the three terms:

First term: Grammar—Oral and written exercises in translating from English into German and from German into English.

Second term: Grammar continued—Oral and written exercises in German. Translation from German into English.

Third term: Grammar continued—Oral and written exercises on the idioms of the language. Schiller—Wilhelm Tell.

From this it would appear that the ground actually covered was about the same as, or a little less than, that which we at present cover in two semesters of a beginning class.

Fasquelle became Professor of Modern Languages and Literature in 1854-55. The same year, students in the classical course were obliged to include three terms of German, and when the University changed to the semester system in the fall of 1856, the requirement in each language remained at one year. In 1857, the German textbook prescribed was *Woodbury's Method*, and the students were still reading *Wilhelm Tell* in the second semester. It would seem that Fasquelle did not vary his work greatly. German became an elective subject for all students in 1855, although French remained as a requirement.

In 1858, courses approved for residence work by candidates for the master's degree were listed; these courses were selected from the regular undergraduate work. Among these were Fasquelle's lectures in French literature (first semester) and in German literature (second semester), which were the requirements in modern languages.

EDWARD P. EVANS, 1862-70.—On the death of Fasquelle in 1862 Edward Payson Evans ('54) became an instructor and after a year was appointed to the professorship of modern languages. While

carrying on advanced studies in Germany, he had developed an enthusiasm for the Prussian school system. He gave the details of the work in modern languages as follows—the first evidence that Germanic philology had reached Michigan:

The subjects taught in this Department embrace:

1. The French and German languages.
2. French and German literature.
3. The general principles of Comparative Philology.

The method of instruction comprises translations, written and oral exercises, examinations and lectures. The following textbooks are used: Fasquelle's *French Method*; Fasquelle's *Colloquial Reader*; Dumas' *Napoleon* (Fasquelle's edition); Racine and Molière; Douai's *German Grammar*; Adler's *German Reader*; Adler's *Handbook of German Literature*. (*Cat.*, 1863-64, pp. 44-45.)

Students in the scientific course (see Part I: TAPPAN ADMINISTRATION) were required the next year to take four semesters of French, but only two of German, and Otto's *German Grammar* took the place of Douai's. A further semester of German was added in 1866-67 as an elective for students in the scientific course. Professor Evans listed some twelve books of reference:

In connection with the Lectures on Comparative Philology and Modern Literature, the following books of reference are recommended as most accessible to the student: . . . Dwight's *Modern Philology*, Max Müller's *Science of Language and Survey of Languages*, . . . the Works of Renan, Rask, Pictet, Nodier, and Wilhelm von Humboldt.

Until Evans' resignation in 1870 the requirements in both languages for those in the classical course remained at two years, with four semesters of each language for the scientific course. Evans also gave lectures on German literature.

GEORGE S. MORRIS, 1870-79.—George Sylvester Morris (Dartmouth '61, Ph.D.

hon. Michigan '81) became Professor of Modern Languages in 1870, and under his direction the program of readings in German seems to have varied from year to year in the more advanced work. For example, in 1871 the senior students in the scientific course read Schiller's *Wilhelm Tell* and the *Geschichte des dreissig-jährigen Krieges*.

The number of students was somewhat increased through the addition of civil engineering students in the fall of 1872 and students of mining engineering in February, 1874, but there was no addition to the amount of the language offered. The younger men in the department usually remained but a year or two and seem to have been compelled to divide their time between German and French. That the conception of the relative difficulty of texts was somewhat different from that of the present day is shown by the fact that in 1874 students in the classical course read Goethe's *Faust* in their second semester, while *Wilhelm Tell* was considered a logical text for the fourth. It must be borne in mind that the preparation of students was very different from that in our own day; in the forties all aspirants to the bachelor's degree had a thorough training in formal grammar and long practice in Latin and Greek.

Although the *Calendar* of 1874-75 was the first to contain a reference to the degree of doctor of philosophy, no graduate courses were available to students in German. The age of specialization had not yet arrived; anyone with linguistic training was eligible to teach several languages. Alfred Hennequin and Paul R. B. de Pont (see also Part II: OFFICE OF THE REGISTRAR; Part IV: DEPARTMENT OF ROMANCE LANGUAGES) appeared for years in the *Calendar* as teachers of both French and German, and Edward Lorraine Walter ('68, Ph.D. Leipzig '77), of the Department of Latin, not only taught

modern languages as well as Latin, but subsequently became head of the Department of Modern Languages.

The advanced work (that is, the third and fourth semesters of study) in German consisted at that time of Goethe's *Iphigenie* and *Dichtung und Wahrheit*, O. Brosius' *Schiller und sein Verhältniss zu dem Publikum seiner Zeit*, Niebuhr's *Tales of Greek Heroes* (for translation into German), and lectures.

Calvin Thomas ('74, A.M. '77, LL.D. '04) became Instructor in Modern Languages in 1878-79. At that time the first-semester courses consisted of beginning German (four hours) and *Emilia Galotti* (five hours); and German plays, Goethe's *Faust*, and *Geschichte der deutschen Literatur* were studied in the second semester. There was no required work in modern languages for the degree of bachelor of arts, but for that of bachelor of science and for the bachelor's degrees in engineering (civil engineer and mechanical engineer), two semesters each of French and German were required, and for the bachelor of letters, four semesters each of French and German.

EDWIN L. WALTER, 1879-87.—Morris was succeeded in 1879 by Walter as Professor of Modern Languages.

A two-hour lecture course on the science of language by Thomas was included in the program, and two years later a further addition to the courses was offered—Herder's *Geschichte der Menschheit*.

The amount of work in German was gradually increasing, eighteen hours being offered in the first semester of the year 1883-84 and fifteen in the second.

CALVIN THOMAS, 1887-95.—The work in French and German was divided in 1887-88; Walter was made Professor of Romance Languages and Literatures, and Thomas became Professor of Germanic Languages and Literatures. The first notice in the *Calendar* of a seminar course

in German appeared at this time. A short course in Gothic was also listed, and scientific German was introduced, so that now a total of thirty-nine hours of work was offered during the year. About this time Swedish and Norwegian in alternate years were first offered by Thomas, one hour a week throughout the year. This broadening of the program was carried further in 1889, when Alexis Frederick Lange ('85, Ph.D. '92), Instructor in German and Anglo-Saxon, taught courses in Middle High and Old High German, and Thomas gave seminars in German literature of the eighteenth and nineteenth centuries. The courses in Old High German were taken over in 1890 by George Allison Hench (Lafayette '85, Ph.D. Johns Hopkins '89), Instructor in German. Max Winkler (Harvard '89, Ph.D. '92) was at that time appointed Instructor in German and offered successive courses in literature of the Reformation and lyric poetry, and Professor Thomas added to his other work a seminar for teachers and courses in linguistic science and the history of German literature.

In May, 1891, Hench was made Assistant Professor and in 1891-92 gave a course in German grammar from a historical and comparative point of view. During the same year Thomas tried the experiment of giving a course in Old Icelandic. In addition to two years of preliminary work thirty-three hours of advanced work were now offered each year.

The instructors in German appointed at about that time were Jonathan August Charles Hildner ('90, Ph.D. Leipzig '99) in 1891, Ernst Heinrich Mensel (Carthage '87, Litt.D. *ibid.* '20, Ph.D. Michigan '96) in 1892, and Tobias Johann Casjen Diekhoff ('93, Ph.D. Leipzig '99) in 1893.

Old Saxon was added to the schedule in 1894, and appeared at intervals in the *Calendar* from that time on.

With the establishment of the separate Department of Engineering in 1895, two sections in beginning German for engineering students were formed. These classes were taught by Diekhoff, who also gave advanced courses in descriptive prose and scientific German. Until the spring of 1928, however, modern language instruction in the College of Engineering was independent of that in the College of Literature, Science, and the Arts.

GEORGE A. HENCH, 1895-99.—While Professor Thomas was absent on leave in 1895-96, he accepted a call to Columbia University, and George Allison Hench, then Acting Professor of German, succeeded him in the headship of the department. Ernst Voss (Ph.D. Leipzig '95) returned as Instructor; and Edwin Carl Roedder ('93, Ph.D. '98, Litt.D. '38) entered the department with an assistantship. Winkler at that time gave a course in *Faust*, through both semesters, but no Scandinavian was offered that year, although in 1896-97 Hench, as Acting Professor of Germanic Languages and Literatures, offered courses in Gothic and Old Norse. He was appointed to a full professorship in the spring of 1897, and in the next year's *Calendar* special work for prospective teachers was first specifically announced. Warren Washburn Florer (DePauw '90, Ph.D. Cornell '97) and John Edward Lautner ('95, M.L. '96) were made instructors in German, and with the growth of the department two more were added in the fall of 1898, Ewald Augustus Boucke (Ph.D. Freiburg '94) and Ernst J. Fluegel. The name of George Hempl ('79, Ph.D. Jena '89, LL.D. Michigan '15) first appeared that year in connection with the Department of German, although his work was not specified. He subsequently offered in the Department of English a course in phonetics which was also listed with the

work in German. Courses in Old Saxon and German folklore were offered. The amount of advanced work beyond the junior grade had now reached twenty hours a week.

GEORGE HEMPL, 1899-1900.—In August, 1899, Professor Hench was killed in an accident, and George Hempl, Professor of English Philology and General Linguistics, was temporarily placed in charge of the Department of German. He entered actively into the teaching, giving courses in Gothic, modern German sounds, methods of teaching German, and German syntax.

MAX WINKLER, 1900-1929.—In the spring of 1900, Max Winkler was made Acting Professor of German and was given temporary charge of the department; two years later he was appointed Professor of the German Language and Literature. The same two years saw the appointment of Herbert DeWitt Carington (Yale '84, Ph.D. Heidelberg '97), Carl Frederick Augustus Lange ('94, Ph.D. '03), Carl Eggert (Iowa '86, Ph.D. Chicago '91), and John William Scholl ('01, Ph.D. '05), all as instructors. The advanced work in the department was rising continually and in 1902-3 amounted to sixty-eight hours. A course in Old Icelandic, by Boucke, indicated a revived interest in Scandinavian, which, however, was not given again until 1907.

The first official mention of extracurricular faculty activity was made in the announcement of the department for 1903-4, as follows:

JOURNAL CLUB.—Meetings of instructors and advanced students of the German Department are held every two or three weeks throughout the year, at which reports are made of important contributions to German philology and literature. (*Cal.*, 1903-4, p. 74.)

Departmental notices also attested the growing importance of the training of teachers. "The requirements of the

teacher's diploma in German is twenty-five hours of work in the Department selected after consultation with the professor in charge" (*Cal.*, 1905-6). By this time Hildner, Boucke, Florer, and Eggert had been advanced to assistant professorships; and Diekhoff had been appointed Junior Professor. Throughout this period, because of a growing interest in German, instructors were added from time to time, and by 1909 there were seven sections for freshmen, ten for sophomores, and seven for juniors, with fifty-five hours of electives for upperclass and graduate students. In 1912 Boucke received a full professorship. In 1911 he had developed a course in Norwegian literature in English, the only work offered in Scandinavian for the next fourteen years. Throughout this period instructors changed rapidly. Among appointments was that of Fred B. Wahr ('12, Ph.D. '15) in 1912 as an instructor.

With the advent of the first World War a feeling against study of the German language and culture spread throughout the country, but was not immediately apparent in the University. In 1916-17 the twelve staff members were teaching nine freshman sections and nine sophomore sections, in addition to many advanced classes. The following year, however, the enrollment dropped to three freshman sections and seven sophomore sections, and three members of the faculty, Eggert, Florer, and Boucke (who had retained his German citizenship) left the University faculty. Frederick William Peterson (Lake Forest '11, A.M. Michigan '16) was transferred from an instructorship in the Department of Engineering English to a similar position in this department in 1916. After a year he became Instructor in Rhetoric. By 1918 Wahr was in military service, and as a result of the various changes, only three men—Winkler, Diekhoff, and Hildner—remained, and only a few sections in ele-

mentary work and twelve hours of senior and graduate work were offered each semester. Work in Scandinavian fell to zero once more; it did not benefit by the misfortunes of its sister language as did the Romance languages. Enrollment fell from a peak of 1,300 to less than 100.

During the first postwar years, return to the study of German was very slow, though there was sufficient development to justify a gradual increase in the faculty. Wahr returned to become Assistant Professor in 1921, and Scholl in 1922 became Associate Professor. During the years 1923 and 1924, however, an increasing number of elementary students necessitated the appointment of five new instructors, among whom was Arthur Van Duren, Jr. ('23, Ph.D. '30), and a further increase in enrollment by 1925 allowed the appointments of Norman Leroy Willey (Syracuse '08, Ph.D. Michigan '25) as Assistant Professor and of Walter Albert Reichart ('25, Ph.D. '30) and three others as instructors.

In 1925-26 the faculty consisted of two professors, two associate professors, two assistant professors, and seven instructors. Work in beginning German was again offered in the second semester. Scientific German became an alternative in the third and fourth semesters, thirteen hours of optional work was offered in the junior courses, and the advanced work totaled twenty-four hours. Courses in Norwegian and Old Norse were again undertaken. The journal club was revived in 1926. Almost every year there was an increase in the number of instructors, among them one of the present members of the staff, Philip Diamond ('22, A.M. '27).

JOHN W. EATON, 1929-35.—John Wallace Eaton (A.M. Dublin '12, LL.B. Saskatchewan '23, Litt.D. Dublin '29) was called from the University of Saskatchewan in 1929 to become Professor of German and Chairman of the Depart-

ment, following the retirement of Professor Max Winkler, who died on March 14, 1930. The German staff in the Department of Modern Languages in the College of Engineering had been consolidated with that of the department in the College of Literature, Science, and the Arts, and in this way three new members were added to the faculty: Alfred Oughton Lee (M.S. Berlin '94, M.D. *ibid.* '98), Professor of Modern Languages, Edmund Wild (Texas '03, M.S. *ibid.* '09), Associate Professor of German, and Aloysius Joseph Gaiss (Alfred Univ. '18, Ph.D. Michigan '29), Assistant Professor. In 1929-30 the work in the department included nineteen sections of beginning German, with two extra off-semester courses; ten sections of sophomore German; six sections of junior work; four extra hours of electives; and ten hours of graduate electives. Ten hours' work in Scandinavian was also offered each semester. The following year there were twenty-four sections of beginning German, and this continued growth in enrollment necessitated the appointment of five more instructors. Willey became Associate Professor, and Reichart and Van Duren were advanced to assistant professorships.

There was a decline to seventeen regular sections of freshman work in the autumn of 1932, an effect of the financial depression. Although the enrollment gradually increased after its lowest point in 1933, the retrenchment in the number of courses continued. During the year 1935 Professor Tobias J. C. Diekhoff and Associate Professor Edmund Wild were taken by death.

HENRY W. NORDMEYER, SINCE 1935.—Henry W. Nordmeyer (Ph.D. Wisconsin '14), of New York University, became Professor of German and Chairman of the Department of German in 1935. Since then the enrollment has increased, and the work has been expanded.

There were 1,035 students enrolled in the department in 1939-40.

METHODS OF INSTRUCTION.—German instruction in the University of Michigan has, of course, been exposed to the various pedagogical fads of the teaching profession and of educational experimenters during the course of nearly a century, but the sane views of the various heads of the department have always prevented great excesses. With prudent conservatism the department has kept in mind the fact that this is an American institution, hence the main objective of the instruction is a reading knowledge of the German language.

In Professor Fasquelle's time there was little to distinguish the teaching of ancient and of modern languages; both were impressed upon the student's mind by dictionary, grammar, and written work, whereas conversation was practically ignored.

With Evans, Thomas, and Hench, Germanic philology was stressed and the interrelations of English and the foreign language were emphasized. Under Hempl's brief chairmanship German phonetics assumed major importance and a good pronunciation was considered the principal essential of any serious work. The direct-method system of instruction reached the University of Michigan shortly after the new century began, but Winkler's conservative attitude prevented its being carried to extremes in the German classrooms.

The present tendency to treat a modern language as a mere incidental in the cultural pattern of the foreigners who speak it—to relegate German linguistic instruction to the position of an orientation course in German civilization—has at present no advocates in our corps of instructors.

The faculty of the Department of Germanic Languages and Literatures has included the names of a considerable num-

ber of outstanding scholars. Edward P. Evans lived abroad after his resignation and became a scholar and *littérateur* of acknowledged importance, writing with equal facility books in German and in English, e.g., *Evolutional Ethics and Animal Psychology* (1898), *Beiträge zur amerikanischen Literatur- und Kulturgeschichte* (Stuttgart, 1898).

Professor Calvin Thomas was in his day perhaps the best-known Germanic scholar in America, and his *Complete German Grammar* still remains the outstanding textbook in its class. He was especially proficient in his work on Goethe and was a pioneer among American scholars in employing the Weimar archives. His edition of *Faust* was his most important contribution in this field, although his *Tasso* and *Hermann und Dorothea* give abundant evidence of his accuracy and erudition.

George Allison Hench was a distinguished philologist and research scholar of his day, already recognized on both sides of the Atlantic, although he was only thirty-three at the time of his death. His great contributions to philology are the *Monsee Fragmente* and *Der althochdeutsche Isidor*, but his name also appears under many articles in scholarly publications of his time.

Max Winkler was a worthy successor of such men as Thomas and Hench, and his great erudition is evidenced by his meticulously annotated editions of many German classics, for example, *Emilia Galotti*, *Egmont*, *Wallenstein*, and *Iphigenie*.

Jonathan A. C. Hildner, whose retirement came in 1938, leaves behind him the record of a long career of inspirational teaching and the remembrance of a fatherly interest in his students. Professor Hildner also was the author of many books and articles, of which the most notable is, possibly, his scholarly edition of *Götz von Berlichingen*.

Tobias J. C. Diekhoff also long occupied an important position on the staff and is remembered with affection by many old graduates. His best book was his annotated edition of *Nathan der Weise*.

Several of the men on the staff who gained no especial recognition from publications in the field of Germanic studies were nevertheless most efficient in their classroom work and contributed much more than their share to the popularity of the department. Among these may be mentioned Ernst Heinrich Mensel, a genial and genuinely loved instructor, who was later a well-known professor at Smith College.

A good number of those whose names appear but transitorily on our faculty lists have attained great distinction in the field elsewhere: Professor Thurnau (University of Kansas), Professor Hollander (Texas), Professor Boucke (Heidelberg), Professor Weigand (Yale), Professor Roedder (New York University), and Professor Lussky (Arkansas).

The total number of advanced degrees in German through June, 1940, was 243. Of these 41 were degrees of doctor of philosophy and 202 were master's degrees—2 of philosophy, 1 of science, and 199 of arts.

The range of subjects treated in the department in the days of Winkler comprises in itself a liberal education. For example, in the second semester of 1909-10 twenty-six distinct German courses for seniors and graduates were offered. These included work in Hauptmann, Arno Holz, Goethe, Schiller, Lessing, Hebbel, two courses in Middle High German, Old High German, Old Saxon, German art and culture of the nineteenth century, the history of German literature, conversation and composition courses, a teachers' course, four proseminars, and the history of the German language.

All this suffered an abrupt change under the influence of the political events of the years 1914-18, and the department has never completely recovered the proportional enrollment it formerly enjoyed, although it has been directed by competent scholars and has received sympathetic support from the University authorities. The present unbalanced enrollment in favor of the elementary courses, which the University has in common with most American universities, is probably caused largely by the fact that entering students usually present themselves without any preparation in the language.

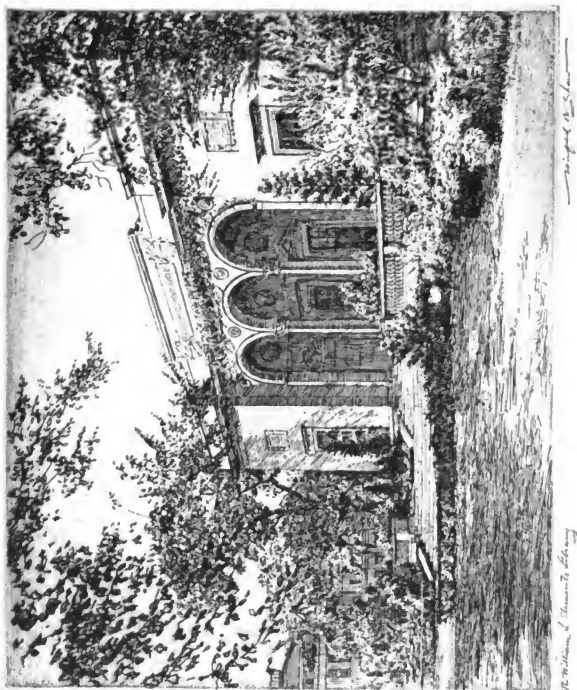
NORMAN L. WILLEY

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PART IV



The William L. Clements Library

THE WILLIAM L. CLEMENTS LIBRARY

The College of Literature, Science and the Arts II

THE DEPARTMENT OF GREEK

IN the several departments there shall be established the following professorships. In the Department of Literature, Science, and the Arts, one of Ancient Languages” Thus, in section 8 of the act of May 18, 1837, there was laid, in accordance with the universal academic tradition of the times, the first and indispensable cornerstone of a liberal arts college. But it was not only in the intellectual and academic foundation of the University that the ancient languages took first place. In providing for the organization of the branch at Ann Arbor, the Regents at a meeting on July 22, 1841, resolved “to authorize the organization . . . by the appointment of a Professor of Languages who shall perform the additional duties prescribed in the resolution hereby modified.” These duties, as we learn from the resolution of July 8, included “the power to organize collegiate classes and to make such arrangements respecting the buildings and grounds as they may deem necessary.” Thus, so to speak, the material as well as the intellectual structure of the University was to be built upon Roman and Greek organization and culture.

The Board then “proceeded to the election of a Professor of Languages in pursuance of the above resolution, and Mr. George P. Williams of the Oakland Branch was appointed such Professor.” The Reverend Mr. Williams did not, however, accept this appointment, but shortly afterward became instead Professor of Mathematics. In his place the Reverend Mr. Joseph Whiting (Yale ’23, A.M. *ibid.* ’37) assumed the duties of this position in September, 1841. For a short period he and Professor Williams constituted the entire faculty of the University. At the time of his death in 1845, just be-

fore the graduation of the first class, Whiting was Professor of the Greek and Latin Languages. The amount of teaching expected of Professor Whiting was, to judge by modern standards, tremendous. Entirely apart from the full schedule in Latin, the *Catalogue* for 1844-45 offered the following courses in Greek: for freshmen, first term, Xenophon’s *Cyropaedia* and *Anabasis* (in extracts); second term, Thucydides and Herodotus; third term, Homer’s *Odyssey*; for sophomores, first term, Lysias, Isocrates, and Demosthenes; second term, Greek Tragedy and Grecian Antiquities; third term, Greek Tragedy; for juniors, first and second terms, Greek Poetry; for seniors, first term, Lectures on the Greek and Latin Languages and Literatures. It is interesting to note in passing that the last-mentioned course, given, if at all, for this one year, represents a type of instruction in the classics considerably in advance of the times. Professor Whiting was assisted during this last year of his teaching by Burritt A. Smith, Tutor in Latin and Greek. He remained during the following year, 1845-46, which marked the arrival of Professor Whiting’s successor. Thereafter Smith’s name disappeared from the *Catalogue*.

From 1845 to 1852 the professorship of Greek and Latin was held by the Reverend Mr. John Holmes Agnew (Dickinson ’23, D.D. Washington Coll. [Pa.] ’52). After the loss of B. A. Smith in 1846, he appears to have shouldered alone the burden of instruction in the classics. Under him the Greek course was slightly modified by the omission of the lectures on language and literature, and by some shifting in the terms during which certain authors were read. He seems to have added a course in Plato in

the senior year and to have established the practice of weekly meetings on Mondays throughout all four years, devoted to the study of the Greek New Testament. It is little wonder that we find Professor Agnew, as head of the faculty for that year, reporting to the Regents on July 18, 1848, as follows: "The course of study has been preserved and accomplished in the several departments, except that of languages. Here the failure has resulted from the impossibility of accomplishing the whole under the existing arrangements." How far this complaint refers to his own heavy schedule, and how far to the newly organized work of Professor Fasquelle, who began teaching in the spring of 1847 as Professor of Modern Languages, is now difficult to determine. However that may be, in 1848-49 marked changes appeared in the program. Greek continued uninterrupted in the first two years, but in the junior year French and Spanish supplanted Greek in two terms of the junior year, and Italian accompanied Plato in the senior year. The trend toward "modernity" had now definitely begun. The program in Greek continued without change until the retirement of Professor Agnew in 1852.

With the arrival of Professor James Robinson Boise (Brown '40, Ph.D. hon. Tübingen '68, LL.D. Michigan '68), the Department of Greek became for the first time an independent unit. Boise was called from Brown University in August, 1852, to be Professor of the Latin and Greek Languages, but when a separate chair of Latin was established the next December, became Professor of the Greek Language and Literature, the title held ever since by the head of the Department of Greek. His appointment, made on the day which marked the election of President Tappan, coincided with a general revision of the curriculum under the influence of German educa-

tional ideas. In the *Catalogue* for 1852-53, stress was laid on the desirability of equating undergraduate work with that of the Gymnasias, on the need for scientific and agricultural courses, and on the possibility of a graduate school. The effect of this on Greek is seen immediately in the limitation of the compulsory Greek courses even in the classical program to the freshman year, with a choice of Latin or Greek in the sophomore and junior years. An interesting innovation was introduced by Professor Boise in 1853, for sophomore Greek students, whereby "English Essays are required of the class on topics relating in general to the age of Pericles or more particularly to the authors read." This, combined with his revival of "Sections on Literature," in the junior year, clearly marks an enlightened effort to "integrate," as the new jargon has it, the traditional material with the changing times. The list of standard works which Professor Boise made for the guidance of students in these constructive exercises includes some of the best authorities of the times—Becker, Grote, Kiepert, Kühner, and others. As always, however, in undergraduate work, when the appeal of novelty made by the newer subjects is met by competitive modifications and allurements in the older ones, one result is a necessary diminution of intensity and thoroughness in the latter. Thus, as early as 1853, the familiar complaint was made by Boise: "The limited amount of time allowed to the study of the Greek language and literature in the collegiate course renders it impossible to do anything more than to make a beginning."

Professor Boise was one of a numerous group of Michigan professors who about this period put out textbooks and editions of wide vogue in the country. His editions of Xenophon's *Anabasis* and Homer's *Iliad*, as well as his *Exercises in Greek Prose Composition*, were well

known and justly popular. Proof of his progressive spirit is to be seen in his recommendation, made as early as 1858, that the pronunciation of ancient Greek be in strict accordance with the written accents and with the Continental sound of the vowels—a system now universal, but not adopted in England until much later. Moreover, he and Professor Frieze, of the Department of Latin, established in the next year (1858-59) a policy of teacher training which was to continue until the present day. The *Catalogue* of that year announced "an advanced class in the Ancient Languages . . . during the last semester of the Senior Year, for the benefit of those who may wish to prepare themselves for teaching in Union and High Schools." In 1868 Professor Boise resigned to accept a position in the University of Chicago, where for another quarter of a century he continued his high standards of scholarship and effective teaching, as his interests turned more and more to research in the field of New Testament criticism. He died in 1895.

The growth of the department by 1858 had called for an assistant to Professor Boise. Adam Knight Spence ('58, A.M. '61) was appointed Instructor in Greek. He gave instruction in both French and Greek the following year and in 1860 added a course or two in Latin, which he dropped in 1863. From 1865 to 1867 he was Assistant Professor of Greek and French and in the latter year left the Department of Greek to be Professor of the French Language and Literature.

In September, 1867, the assistant professorship of ancient languages was given to a young man of twenty-eight who was for nearly forty-five years to direct with high distinction the policies of the Department of Greek. Professor Martin Luther D'Ooge ('62, Ph.D. Leipzig '72, LL.D. Michigan '89, Litt.D. Rutgers '01) was born in the Nether-

lands in 1839 and came as a boy to this country. Graduating from the University of Michigan in 1862 as a pupil of Professor Boise, he attended the Union Theological Seminary between 1864 and 1867. In the latter year, before his ordination, he was called to Michigan. On the resignation of Professor Boise he was appointed Acting Professor of Greek. In 1870 he became Professor of Greek, a position which he held continuously, except for brief periods of leave, until his retirement in 1912. During the greater part of this period he shared the instruction in the department with Professor Albert Henderson Pattengill ('68, A.M. '71), who began teaching as Assistant Professor of Greek and French in 1869, and continued successively as Assistant, Associate, and full Professor of Greek up to within a year of his death in 1906. Thus, the period of D'Ooge and Pattengill succeeds as the second unit in the department's history between that of the pioneers Whiting, Agnew, and Boise and the present generation.

In 1870 Professor D'Ooge obtained leave of absence to study in Germany, whence he returned in 1872 with a degree of doctor of philosophy from Leipzig. During his absence his work was taken over by Acting Professor Elisha Jones ('59, A.M. '62), who in 1867 had declined the appointment subsequently given to Professor D'Ooge.

Three significant developments during the seventies may be observed in the offerings of courses, doubtless the result of D'Ooge's German training and of the growing popularity in general of German methods. First, beside the traditional incidental lectures on "Grecian Antiquities," there appeared in 1873 a series of lectures on the history of Greek literature as a part of the regular senior course. Moreover, the regular reading courses were accompanied by such courses as Lectures on Greek Tragedy (1877-78).

Also, for the first time, in 1875-76 there was offered a lecture course on the history of classical philology. Secondly, the range and variety of authors read increased and the traditional order of presentation was shifted. Theocritus, for example, was first offered by Professor Pattengill in 1878, and the range of illustrative material in the course on Greek oratory was extended by Professor D'Ooge's highly successful edition of Demosthenes' *On the Crown* in 1875.

Thirdly, the teachers' course in Greek, which had had a precarious existence since its establishment by Professor Boise in 1858, was given regularly, beginning in 1875, as the Teachers' Class, in each semester of the senior year.

The following decade brought still further changes. The one-hour lecture course on the history of Greek literature and art, which D'Ooge had started in 1879-80, became by the end of the decade two separate courses, one in literature and one in art. The old incidental lectures on Greek antiquities were revived as an independent unit, and a special lecture course on Homeric antiquities was added (1883-84). The old courses in Sophocles and Euripides reappeared with the modernized title of Masterpieces of Greek Tragedy (1882-83), and the Thucydides course bore the supplementary title, Lectures on the Political History of Athens during the Peloponnesian War. Also, more out-of-the-way fields such as Lucian and the *Lyric Anthology* were covered. The "Greek Seminary" of the German type first made its appearance in 1883-84, and the Teachers' Class in the same year became the Teachers' Seminary. Hellenistic Greek, replacing New Testament as the traditional course, was revived by D'Ooge in 1882-83.

D'Ooge spent the year 1886-87 in Athens as director of the American School, and his work was carried by Instructor

Walter Miller, who in the following year became a member of the Latin staff. The results of this year of inspiration on the Greek program are seen both in increased attention to Greek archaeology, exemplified in a course on Pausanias with particular reference to Athenian monuments, and in the introduction of work in modern Greek. From 1890 to 1897 Professor D'Ooge's labors were increased by the demands of his position as Dean of the Department of Literature, Science, and the Arts.

By 1890-91 the graduate seminar, Interpretation of Greek Inscriptions and Study of Dialects, was offered by D'Ooge, and a course in the minor Greek poets (Homeric Hymns, Callimachus, and Musaeus) by Pattengill. By 1889-90, when the total enrollment in the Department of Literature, Science, and the Arts was 1,001, the number of courses had increased to about fifteen, and the total number of students in all courses in Greek was approximately 350. From the three fields of Latin, Greek, and mathematics the students were required to select two full years in two fields and one in the remaining subject. To take care of such numbers, the work in Hellenistic Greek was turned over in 1891 to the Department of Semitics (see Part IV: DEPARTMENT OF ORIENTAL LANGUAGES AND LITERATURES), and new instructors were added to the Department of Greek. Herbert Fletcher de Cou ('88, A.M. '90), an exceedingly brilliant if somewhat moody scholar, was appointed in 1892-93 Instructor in Greek and Sanskrit. Besides assisting with freshman Greek he gave the course in the history of Greek literature and that in modern Greek. During the brief period of his tenure he showed extraordinary versatility, offering the courses in Greek dialects, epigraphy, and the Greek rhetoricians. In 1895 he was succeeded by William Henry Wait (Northwestern

'79, Ph.D. Allegheny '88), on a similar appointment. Except for the year 1899-1900, when De Cou returned without salary to substitute for him, Wait continued until 1901, at which time he shifted to the teaching of German. He later had charge of the modern language work in the Department of Engineering.

At this point it is appropriate to attempt a personal appreciation of the two men who served the department longer than have any others.

Pattengill's vigorous but somewhat overbearing personality, coupled with a real mastery of the Greek language, made him an efficient drillmaster, though scarcely a sympathetic and popular instructor for the large classes of undergraduates which, under the closely prescribed curriculum of that time, fell to his charge year after year. Those whose sensibilities were not too harshly ruffled by his often savage comments, or who knew how to defend themselves, felt that they owed him a thorough grounding in the language, and that they gained a valuable insight into the minds of some of the great figures of Greek literary history. Certainly some of the courses that he gave in his later years, when time and happier personal circumstances had mellowed his asperities, are remembered by his pupils as among the permanently valuable experiences of their college life.

His martinet-like attitude toward his classes did not prevent Pattengill from taking a lively interest in student affairs, particularly athletics, and in his capacity as chairman of the Board in Control he became well known to both students and alumni.

Less aggressive in personality than Pattengill, and perhaps less impressive in the eyes of undergraduates, D'Ooge rendered services to his department and to the University in a different direction. Trained in the scientific method of clas-

sical study under Georg Curtius and his colleagues of the philological faculty at Leipzig, he was able to develop the graduate study of Greek in the University. His pupils raised the teaching of Greek to a higher level in many of the small colleges of the Middle West, and several of them became valued members of the faculties of other universities, as well as of the University of Michigan. His experience in Greece and his vivid enthusiasm for its history and art stimulated interest in archaeological studies. His personal contacts with other American scholars and the cordial recognition which his qualities won from them helped to give the University an acknowledged position as a trainer of classicists and to lift it from the ranks of provincial colleges. His amiable personality made a deep impression upon his students, many of whom regarded him with a real devotion to the end of his life.

In his earlier days D'Ooge's scholarship, which was sound rather than highly original, leaned somewhat heavily upon German work; but that was true of almost all American classical studies in his time. Hence his editions of classical masterpieces, though widely used for many years, are superseded. His learned study of the Acropolis of Athens was cordially received at the time of its appearance; but new discoveries made it authoritative only for a short time. Thus, his permanent contribution to the University rests, as is true of many devoted teachers, upon the influence which he exerted upon his pupils.

After the passing of Professors D'Ooge and Pattengill the history of the Department of Greek is concerned, down to the end of June, 1940, entirely with persons still living, and only a brief chronicle of facts can fittingly be added. The junior position in the department left vacant by the death of Pattengill was filled in 1906 by the appointment of Arthur

Fairbanks (Dartmouth '86, Ph.D. Freiburg '90, Litt.D. Dartmouth '09), then a member of the faculty of the University of Iowa; but Fairbanks' archaeological studies were attracting attention elsewhere, and in 1907 he accepted the flattering offer of the directorship of the Boston Museum of Fine Arts. He was succeeded by Campbell Bonner (Vanderbilt '96, Ph.D. Harvard '00), who came to the University from the George Peabody College for Teachers in Nashville, Tennessee.

From 1907 until Professor D'Ooge's retirement in 1912, the staff of the department consisted of D'Ooge, Bonner, and John Garrett Winter (Hope '01, Ph.D. Michigan '06), one of the ablest of D'Ooge's pupils, who divided his time between the Departments of Greek and Latin, and rose to the position of Professor of Greek and Latin some years before he was transferred to the Department of Latin, of which he became Chairman on the death of Professor Kelsey.

During the period following 1912 a number of younger men were associated with the department for varying periods, and all of them have either been promoted to higher rank in the University of Michigan or have been drawn away to important and responsible positions elsewhere. Frank Eggleston Robbins (Wesleyan '06, Ph.D. Chicago '11), who came from the University of Chicago in 1912, served in the Department of Greek for nine years, and then accepted the position of Assistant to the President. This position he still holds, under an arrangement which enables him to give one course in the department. Emerson Howland Swift (Williams '12, Ph.D. Princeton '21) was called to Columbia, and James Penrose Harland (Princeton '13, Ph.D. *ibid.* '20) to the University of North Carolina. John Bradford Titchener (Clark '17, Ph.D. Illinois '23) is now the chairman of the department of

classics in Ohio State University. Benjamin Dean Meritt (Hamilton '20, LL.D. *ibid.* '37, Ph.D. Princeton '24) spent five years in the University before migrating first to Johns Hopkins and later to the Institute of Advanced Study at Princeton. Warren Everett Blake (Harvard '20, Ph.D. *ibid.* '24), who came to the University as Instructor in 1925, is now Professor of Greek; James Eugene Dunlap (Ripon '10, Ph.D. Michigan '20), who has been on the staff since 1923, is now Professor of Latin and Greek; Clark Hopkins (Yale '17, A.M. Oxon. '21, Ph.D. Wisconsin '24), whose chief interest lies in the field of archaeology, is an associate professor of the same subjects.

The abolition, in the early years of the present century, of any requirement of Greek for the degree of bachelor of arts had the same result in the University of Michigan as in other universities. Classes in Greek have become small groups consisting usually of students who are genuinely interested in the subject and are able to profit by the best instruction that the department can supply. A small number of graduate students from other universities is attracted to the courses offered by the department; and in general the graduate work of the department has been tested and approved by the performance of those who have taken the doctorate. By the institution of certain courses that do not require knowledge of the Greek language, an attempt has been made to bring some understanding of ancient life within the reach of non-classical students.

Careful scrutiny of the qualifications of all instructors added to the staff has resulted in an excellent record of researches proceeding from the department, and in recent years special attention has been drawn to the papyrological publications, made possible by the foresight of Professor Kelsey in bringing about the acquisition of the papyri (see Part

VIII: ART AND ARCHEOLOGICAL COLLECTIONS), in which the members of both the classical departments have taken part.

CAMPBELL BONNER
WARREN E. BLAKE

THE FREER MANUSCRIPTS

These old parchment manuscripts were found, probably in a grave, in Egypt by unknown persons early in 1906. They were sold to an Arab dealer named Ali, in Gizeh near Cairo, for some fifteen hundred dollars, according to report. The four manuscripts were offered by Ali first to the Royal Library in Berlin and later to the British Museum at a price of a thousand pounds, but no encouragement was given the dealer at that price. Both the English and the Germans thought the price too high, as not much was expected textually from parchment manuscripts.

On December 19, 1906, Mr. Charles L. Freer of Detroit visited the dealer Ali and bought many art objects. He was then shown the manuscripts and presumably the same price was asked. He had little desire to purchase, though he admired the writing of one of the manuscripts. Finally, urged by Dr. Mann, who was traveling with him, he offered one-half the price asked. It was accepted, and the manuscripts were sent to Detroit. There they remained unnoticed in a vault until the fall of 1907, when Professors Kelsey, D'Ooge, and Sanders of the University were asked to examine them. Their great value textually was at once recognized, and the task of editing was assigned to Professor Sanders; Mr. Freer assumed the expense of publishing.

Manuscript I is of the fifth century A.D. and contains Deuteronomy and Joshua. It once contained the whole Hexateuch, but the first four books are entirely lost. The Septuagint Greek text is found in the manuscript, and it is quite

free from the errors generally referred to the influence of the Hexapla edition of Origen.

Manuscript II is a psalter of the fifth century but very fragmentary. No Psalm is complete, though parts of 151 Psalms and one Ode are preserved. It is a text of the Septuagint and of the psalter type, of which it is the oldest example.

Manuscript III is of the fourth century and contains all of the four Gospels except for three missing leaves. It is thus one of the three oldest known parchment manuscripts of the Gospels and has, besides, a most interesting text. The whole of Matthew and most of Luke are from an older Antiochian text, while the first eight chapters of Luke and most of John are of the Alexandrian type. The first quire of John (1-5.11) is in a different hand and of disputed age, yet textually it is Egyptian but uninfluenced by the Alexandrian edition. The first five chapters of Mark belong to the so-called Western text of the North African variety. The rest of Mark is closely allied to the text of Caesarea. Near the end of Mark a new saying of Jesus is added. So mixed a text has had a marked influence on the views of New Testament scholars.

Manuscript IV once contained all of the Epistles of Paul, but it is so badly decayed that only parts of eighty-four leaves were recovered, giving 165 legible fragments. The manuscript belongs to the sixth century and has a characteristic Egyptian text of that time. All four of these manuscripts were published in Volumes VIII and IX of the Humanistic Series.

Some later additions to his Biblical collection were made by Mr. Freer, of which the most important is No. V, a third-century papyrus codex of the Minor Prophets in Greek. This is the oldest and best manuscript of that part of the Bible. It was published in Volume XXI of the Humanistic Series.

Manuscripts I, III, and V have been published in facsimile by the University. At present all of the manuscripts are in

the Freer Gallery of the Smithsonian Institution, Washington.

HENRY A. SANDERS

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THE DEPARTMENT OF HISTORY

SYSTEMATIC instruction in the field of history on a scientific basis is comparatively recent, dating in Europe from the early part of the nineteenth century. American, European, and especially German developments set the example. It was only in 1828 that Harvard, which led the way among American universities, established a professorship of civil history. Under these circumstances, the rather meager provision for the subject in the early years of the University of Michigan is not at all surprising.

In 1844-45, the year that the first class was graduated from the University of Michigan and the second year of the University *Catalogue*, the Reverend Daniel Denison Whedon (Hamilton '28, D.D. Emory '47, LL.D. Wesleyan '67), a Methodist Episcopal theologian and author—though apparently his repertory did not include any historical work of moment—was appointed to the chair of logic, rhetoric, and history. Thus history supplanted grammar in the medieval trivium, and the Reverend Professor continued to occupy his threefold chair until

he left the University in 1852. Evidently ancient history was taught by the Department of Ancient Languages, where portions of Herodotus, Thucydides, and Livy were read by freshmen. Medieval history for sophomores, modern history for juniors, and additional ancient history for freshmen were added in 1846-47. Since each occupied only one of the three terms, the work was doubtless nothing more than a bare series of recitations. As yet, however, this was the method employed throughout the country in the few institutions where history was taught. In 1847-48 the term philosophy of history was substituted for mere history.

For the first two years of the Tappan administration no one was recorded as specially concerned with history, but in 1854—such was the versatility of the men of those times—Erastus O. Haven, the future President, was transferred from Latin to history and English literature. He resigned in 1856, and, after a varied and useful career in the East, was recalled, in 1863, to succeed President Tappan. Haven taught throughout his administration. He held the chair of rhetoric and English literature until 1865, when he accepted that of logic and political economy. In 1868 he was transferred to the chair of mental and moral philosophy, which he had taught for one year along with his other subjects.

In the meantime, in 1857, a pioneer in historical teaching of the modern type had appeared at the University in the person of Andrew Dickson White (Yale '53, A.M. *ibid.* '56, LL.D. Michigan '67). A young man barely twenty-five, he had graduated from Yale four years previous to his call to Ann Arbor as the Professor of History and English Literature. Coming from a family of substantial means he had had the advantages of travel and had spent much of the interval in Europe; also, he had begun to collect that remarkable library

which is now one of the distinctive possessions of Cornell. In spite of his prospective wealth he early sought a means whereby he could be of service in the world. With great mental alertness and boundless energy, he was at once a rapid reader and a copious and informing talker, who possessed human charm and was interested both in men and in things. Yet, throughout his busy academic and public life, he invariably found time to help and encourage young men, as the present writer can testify. His interest in the possibilities of the West seems to have been first aroused by an address at Yale by President Wayland of Brown.

When the third-year course was still coupled with acoustics and optics¹ he started with a threefold aim, as announced in the *Catalogue* of 1857-58: "First—to conduct the student through a careful review of modern history. Secondly—to exercise him in original investigation and close criticism of important periods and noted characters. Thirdly—to give him some insight into the Philosophy of History." His original plan was a modest one: for the first year, John Lord's (Ford's, in the *Catalogue*) *Manual of Modern History*; for the second year, private reading under direction; and for the third year, the philosophy of history, with Guizot's *History of Civilization* as a guide for the students. The fourth year the instruction was mainly by lectures, with collateral reading from the standard historians then available. He threw himself with ardor into the work. Not only did he break away from the old recitation method, he introduced the interleaved syllabus, he had students at his house one evening a week for discussions and reports, he went about the state lecturing, he bought books for the Library, and even planted trees on the campus. Indeed, for four years he was a

¹ Acoustics and optics were probably required only of candidates for the degree of civil engineer.

member of a committee in charge of improvements on the campus, and for one of these years served as Superintendent of University Grounds, with "power to prepare and perfect a plan for improving and beautifying" them.

Although White retained his nominal connection with the University till 1867 and gave a few lectures, his residence and active teaching ceased in 1863 on his election to the New York Senate. He subsequently became president of Cornell University, 1867-85, and minister and ambassador to Russia and Germany.

In 1862 Charles Kendall Adams ('61, A.M. '62, LL.D. Harvard '86), who was only twenty-six years old but had had some previous experience as a teacher, was added as a second member of the staff. For the first year, while White remained, he was delegated to teach constitutional law and constitutional history. Then for a time, even though his chief was on the eve of departure, he was called upon to teach Latin as well; indeed, in 1865, he was appointed Assistant Professor of History and Latin. However, in 1867, when he was promoted to a professorship, he was able to devote himself solely to history. As a matter of fact, he secured a year's leave of absence for study in Germany. Up to this time he seems to have carried on the traditions of Andrew White in the main, even to the wording of the announcement in the *Catalogue*. Now he introduced some changes. The greatest of these was a seminar which he began to conduct in 1871-72 on the Prussian model. Though this class was not so described in the *Catalogue*, he apparently employed the seminar method of reports and discussions (Farrand, p. 269)—a method soon adopted by Moses Coit Tyler, who in 1867 began his brilliant term of fourteen years as a teacher in the University of Michigan.

It is a curious coincidence that three

men bearing the historic name of Adams should have introduced the seminary method into their respective universities in the seventies. C. K. Adams apparently was the innovator in point of time (1871-72), but Henry Adams at Harvard and Herbert Baxter Adams at Johns Hopkins first showed tangible results in publication by their students. Moreover, undergraduates were admitted to the course at the University of Michigan, and the work seems to have been of a general character rather than detailed research. When the American Historical Association was founded in 1884, C. K. Adams and Moses Coit Tyler signed the call for the first meeting. Later, Adams was made a member of the council—one of five from the University of Michigan to hold that office. In 1885 he succeeded Andrew D. White as president of Cornell. Although he was energetic in academic and scholarly affairs and lectured with force and clarity, his few publications have not proved of enduring importance.

Meanwhile, history as a subject of study was gaining recognition. President Angell, who became an authority on international law, in his inaugural address on Commencement Day, 1871, included it with modern languages as a subject of increasing importance, and in 1878-79 it was made a part of the new English course leading to the degree of bachelor of letters. In 1881 a School of Political Science was established, with history as one of the required subjects. C. K. Adams was the first Dean. He was succeeded in 1885 by Thomas M. Cooley, the first chairman of the Interstate Commerce Commission and one of the most outstanding jurists and legal writers this country has ever produced. Judge Cooley was at the same time appointed to the professorship of American history and constitutional law, which he retained until his death in 1898, though he was absent except for brief intervals after 1886

and ceased to lecture in 1894. The School of Political Science was absorbed by the Literary Department and did not survive even in name beyond 1890.

Men who afterwards went into other fields began as teachers of history; for example, Harry Burns Hutchins ('71, LL.D. '21), subsequently Dean of the Law School and from 1910 to 1920 President of the University, began as Instructor in Rhetoric and History in 1872-73 and was promoted to an assistant professorship in the following year. He was succeeded in 1876 by Isaac Newton Demmon ('68, A.M. '71, LL.D. Nashville '96), who taught rhetoric and history. Demmon completed the *History of the University of Michigan* begun by Burke A. Hinsdale. Subsequently, Demmon was for many years head of the Department of English; also, he was the very efficient editor of the *Alumni Catalogue* of 1911, and, as chairman of the Library committee, rendered invaluable service in building up the present collection. Thanks to the start made by Andrew White, C. K. Adams, and himself, the collection in English history is, after that of Harvard, one of the most complete in the country. During the year 1878-79 Assistant Professor Pattengill, of the Department of Greek, was added to the staff to teach the general history of England, while European history and advanced English constitutional history remained with C. K. Adams. Demmon, during his brief tenure in the department, taught American history.

In the *Calendar* of 1879-80 the Reverend Richard Hudson ('71, A.M. '77, LL.D. Nashville '01) was listed as Assistant Professor of History. After the first year the "Reverend" was dropped. Pattengill and Frieze for a time taught ancient history, and during the next few years Adams and Hudson took over all the modern history. Hudson had started as a Methodist minister, but finding that

a change in his beliefs made it impossible for him to continue his original profession, he utilized his savings to study history for three years in Europe. In 1885 he was made head of the Department of History and in 1897 Dean of the Department (now College) of Literature, Science, and the Arts. He retired in 1911 and died in 1915. Having inherited a substantial fortune from his brother, a Detroit merchant, he left funds in his will for the founding of the Richard Hudson professorship in English history. This was the second of the endowed professorships at present existing in the University of Michigan. Richard Hudson, except for a few scattered articles, published nothing. He read widely and lectured with exceptional clearness, and, in his gentle and mildly humorous way, he had the courage to defend his convictions, but he was timid about expressing himself in print.²

President Tappan, from the time of his inaugural in 1852, had visions of graduate studies, and occasional "lectures" and some seminar and laboratory instruction were provided, particularly after 1870, for graduate students, but there was no specific reference in the catalogues for work leading to the degree of doctor of philosophy until 1874-75. In 1884 the first doctor's degree in history was awarded to George W. Knight, who later became head of the history and political science department of Ohio State University and, for a time, dean of the School of Education in the same institution. Three or four doctorates annually were conferred in the interval, but the second one in history (to Ephraim Douglas Adams) was not obtained till 1890. After a decade at the University of

² The author of this article, Arthur Lyon Cross, was appointed to the Richard Hudson professorship in 1916. Professor Cross died June 21, 1940. At the time of his death he was the senior member of this department, which he had served for forty-one years. The professorship is now held by A. E. R. Boak.—Editor.

Kansas, Ephraim Adams was called to Leland Stanford, where he spent the remainder of his life. Altogether, during the fifty-six years from June, 1884, through June, 1940, eighty-eight doctor of philosophy degrees in history were awarded, and in the same period nearly eight hundred master's degrees in history were granted. The number of doctor's degrees might have been somewhat greater except for the inadequacy of graduate fellowships, especially in the earlier years. Moreover, some who have started their graduate work here have been advised to finish it elsewhere.

In 1886, the year after his graduation from the Law Department, Andrew Cunningham McLaughlin ('82, '85, LL.D. '12) was appointed Instructor in Latin. The following year he was transferred to the Department of History and has taken his place as perhaps the most distinguished scholar ever connected with the department. He was made Professor of American History in 1891 and held that office till 1906, though from 1903 to 1905 he was absent in Washington as director of the Bureau of Historical Research, Carnegie Institution. Also, from 1901 to 1905, he was managing editor of the *American Historical Review*. Noted as a scholar, "Andy Mac" was an inspiration to students and graduates of the University for a decade. In 1906 he was called to the University of Chicago as head of the Department of History, a position which he held until 1927. He has been president of the American Historical Association and is a corresponding member of the Massachusetts Historical Society—an honor shared by President Angell, Regent Clements, and three of his past and present colleagues in the department. McLaughlin began a considerable list of publications with a life of Lewis Cass for the "American Nation" series in 1891, and since his retirement in 1935 has put forth what is the chief

embodiment of his life work, *A Constitutional History of the United States*.

In the *Calendar* for 1888-89 it was stated that "with the flexible elective system it has been found unnecessary to retain an independent School of Political Science." McLaughlin seems to have taken over some of the work in American history and in 1890-91 was relieved of the teaching of English history by John H. T. McPherson (Johns Hopkins '88, Ph.D. *ibid.* '90), who also was assigned Greek and Roman history. Though Hudson and McLaughlin continued on the staff, the nineties witnessed the coming and going of various men well known in the profession who were birds of passage so far as Michigan was concerned. McPherson remained only one year and went to the University of Georgia, where he became chairman of the Social Science Group. He was succeeded by Herman Vandenburg Ames (Amherst '88, Ph.D. Harvard '91, Litt.D. Pennsylvania '25), who became an assistant professor, but left in 1894. At the time of his death in 1935 Ames was a professor of American history at the University of Pennsylvania, and from 1907 to 1928 had been dean of the Graduate School there.

During the absence of Professor Hudson on leave in 1892-93, an assistant professor, David Ellsworth Spencer, whom the writer has been unable to identify, taught in the department for one year. This same year came Earle Wilbur Dow ('91), who, save for two years' leave for study in Europe, taught in the department continuously for a period of more than forty years and retired as Professor Emeritus in 1938. In 1894 he gave the first courses in history to be offered in the summer session, which was formally established in that year.

Again there were temporary sojourners who later accepted positions in other institutions. Marshall Stewart Brown (Brown '92, A.M. *ibid.* '93) taught here

during the academic year 1893-94 and then accepted a call to New York University, where he became a professor of history and the dean of the College. William Dawson Johnston (Brown '93, Litt.D. Rutgers '11) was three years in the department, from 1894 to 1897; he later went into library work. For some time he was in charge of the American Library in Paris. He died in Washington in 1928. During the absence of E. W. Dow, Frank Haigh Dixon ('92, Ph.D. '95) taught for the year 1896-97. The next year he was Acting Assistant Professor of Political Economy. In 1898 he left for Dartmouth, where he remained till 1919, and then was called to a professorship at Princeton. In 1897-98 two newcomers were Theodore Clarke Smith (Harvard '92, Ph.D. *ibid.* '96) and Wilbur Cortez Abbott (Wabash '92, A.M. Yale '09). Smith remained only one year. Since 1903 he has been a professor of American history in Williams College. Among his various writings perhaps the most generally known is his *Life and Letters of James Abram Garfield* (1925). Abbott, who remained for two years, was one of the few young Americans who studied history at Oxford before the days of the Rhodes scholars. After teaching successively at Dartmouth, Kansas, and Yale, he was called to Harvard in 1920. Although his specialty is the Cromwellian and Restoration period, he has written, among other things, a general work on the *Expansion of Europe* (1917) and two brilliant series of biographical sketches, *Conflicts with Oblivion* (1924) and *Adventures in Reputation* (1935).

When Arthur Lyon Cross (Harvard '95, Ph.D. *ibid.* '99) was called to the University in 1899 he was asked to teach the course in ancient history, which still was handed to the latest comer; but his main work was in English history—a general course primarily for sophomores and an advanced course which later de-

veloped into a seminar. The large introductory course was in the field of medieval history, and was given by Dow, who also conducted an advanced course and a seminar in the same field. Hudson devoted himself to modern European history and to the Near and Far East. McLaughlin was in charge of a separate Department of American History.

English history was assigned to a room with a gallery in the north wing of University Hall. There the floor was often littered with old newspapers to tempt an occasional idler to whom note-taking proved too great a strain. Outside the department Alfred Henry Lloyd gave a course in political theory; Roman Law was offered by the Department of Latin and in the Law School. In 1900-1901 John Archibald Fairlie (Harvard '95, Ph.D. Columbia '98) was called as Assistant Professor to teach political science. Political science was taught in the Department of History until the advent of Jesse Siddall Reeves in 1910, who in the next thirty years built up the present flourishing organization (see Part IV: DEPARTMENT OF POLITICAL SCIENCE).

As attendance in the introductory courses in medieval and American history grew and other courses were developed, additional instructors were necessary. The greater number of them remained for a year or for two or three years at most until the depression in 1929, after which it was difficult to find places for young men. It was the policy after they had gained some experience to pass them on to institutions where there was a clear field ahead. Among those who thus went on to win distinction elsewhere were Chauncey S. Boucher, chancellor of the University of Nebraska, Edward S. Corwin, McCormick Professor of Jurisprudence at Princeton, Professors Paul V. B. Jones and F. G. Randall, of the University of Illinois, and Wynand Wichers, president of Hope College.

Meanwhile, there have been various changes in the more permanent staff—losses, replacements, and additions. In 1906 Frederic Logan Paxson (Pennsylvania '98, Ph.D. *ibid.* '03) was called as Assistant Professor of American History; he was promoted to a junior professorship the following year. In 1910 he accepted a professorship at the University of Wisconsin. There he remained till 1932, when he went to the University of California as Margaret Byron Professor. He is one of the better-known members of the profession and has written various works of general interest, including *The History of the American Frontier*, which was awarded the Pulitzer prize in 1924. He was president of the Mississippi Valley Historical Society in 1917 and was a member of the council of the American Historical Association 1921–25.

In 1908 Hudson's freshman course in general English history was introduced as an alternative to the European history course formerly prerequisite to all other work in the department. Hudson also taught the basic sophomore course in English history from 1909 until it was merged with the freshman course in 1911.

In the autumn of 1909 William Alley Frayer (Cornell '03) was called to substitute for Cross, who was invited to Harvard as a visiting lecturer for the second semester. Frayer proved an effective teacher and a popular lecturer throughout the state and even beyond. He was put in charge of the introductory year course in European history in 1911–12, when its content was changed from the history of the Middle Ages and Renaissance to that of modern Europe. In 1929, five years after being advanced to a full professorship, he went with the Bureau of University Travel. He subsequently became the executive secretary of the Cranbrook School.

The introductory English history was placed under Edward Raymond Turner

(St. John's '05, Ph.D. Johns Hopkins '10), who came from Bryn Mawr in 1911. Turner also proved to be a clear and forceful lecturer and a prolific writer as well, of a painstaking and literal type. His chief work is an exhaustive *History of the Privy Council* in four volumes. In 1924 he accepted a call to Yale, but the following year went to Johns Hopkins on the retirement of Professor John M. Vincent. He died December 31, 1929, at the age of forty-eight.

Another newcomer in the year 1911–12 was Ulrich Bonnell Phillips (Georgia '97, Ph.D. Columbia '02). Already he was known as a leading authority in the field of Southern history, particularly with reference to slavery and plantation management—a reputation which he amply confirmed by his subsequent publications. In 1929 he was called to Yale, where he died January 21, 1934, at the age of fifty-seven. In addition to various biographies and special studies, he published *American Negro Slavery* (1918) and *Life and Labor in the Old South* (1929), his ripest and most significant productions. During 1918–19 he was in military service, having the rank of captain in the Military Intelligence Division. He was a member of the council of the American Historical Association.

Relieved of his classes in the general history of England, Cross was able to develop a course known as the Constitutional and Legal History of England, to turn his "studies" course into a seminar on the Tudor and Stuart periods, and subsequently (1919) to offer a course on the British Empire.³

Legal History and similar courses were designed mainly for "prelaw" students. Before 1897 a combined curriculum in letters and law had been perfected. By

³ Professor Cross was the author of a number of books, including the well-known text entitled *A History of England and Greater Britain*. He was a fellow of the Royal Historical Society and a corresponding member of the Massachusetts Historical Society.—Editor.

taking a special amount of required and recommended work and by attaining sufficiently high grades, a student could enter the Department of Law at the end of his third year, and, after a year of satisfactory work there, secure his bachelor of arts degree and his degree of bachelor of laws two years thereafter, thus shortening the requisite period for obtaining the two degrees. Among the required subjects were American constitutional history and subsequently English constitutional history.

With the coming of Arthur Edward Romilly Boak (A.M. Queen's University [Kingston, Ont.] '07, Ph.D. Harvard '14) in 1914 the department for the first time had a specialist in the field of ancient history, and the basic course in that field was opened to freshmen, as a third option for the introductory year in history. Boak's scholarly production and administrative capacity were recognized by rapid promotion. He was made a full professor in 1920 and, on the death of Van Tyne in 1930, was appointed Chairman of the Department of History. William Lytle Schurz (California '11, Ph.D. *ibid.* '15) came to the University in 1915 and was appointed to an assistant professorship the following year. In 1916-17 Schurz introduced the first course in Latin-American history, and a course was offered by Boak in military history. In 1918 Van Tyne, Turner, and Frayer offered a course on the issues of the war, and Cross gave a course in the summer for army mechanics. Various members of the department lectured to training camps and other groups and contributed to war literature.

After the departure of Schurz in 1920, Latin-American history was omitted for a year, but it was resumed in 1921 on the arrival of Arthur Scott Aiton (California '16, Ph.D. *ibid.* '23), who rose by successive steps to be a professor in 1929, and through his scholarship and

teaching ability has developed Hispanic-American history to the point where it occupies an important place in the curriculum. In 1924 the department was greatly strengthened in the field of early modern European history by the coming of Albert Hyma ('15, Ph.D. '22), who achieved a European reputation by his studies on the early *Christian Renaissance* (1924) and *Erasmus and the Humanists* (1930). In 1925 another promising branch was started when Nicholas S. Kaltchas, a Greek, well equipped in languages, including Turkish, was appointed to give work on the Near East. Unfortunately, his health failed and after a leave of absence he was obliged to resign. In 1927-28 Esson McDowell Gale ('07, A.M. '08, Litt.Ph.D. Leiden '31) was a visiting lecturer in Chinese history. In 1932 John William Stanton (Missouri '29, Ph.D. California '32) was brought in, and, well versed in Russian, Chinese, and Japanese, developed courses until 1940 in the Near and Far East.

In 1927-28 the staff had reached a point where there were six professors, one associate professor, three assistant professors, and seven instructors. The associate professor was Preston William Slosson (Columbia '12, Ph.D. *ibid.* '16), who came as an instructor and was appointed to a full professorship in 1937. He is known as a brilliant and lucid lecturer on contemporary problems and for his books on recent European history. Arthur Louis Dunham (Harvard '14, Ph.D. *ibid.* '23), who came in 1924, is a specialist in economic history; as his chief work thus far he produced in 1930 a scholarly monograph, *The Anglo-French Treaty of Commerce of 1860*. He was made an associate professor in 1932. Among the new members attached to the department was Howard Meredith Ehrmann (Yale '21, Ph.D. *ibid.* '27), who became an associate professor in 1937-38. His studies on the war is-

sues have made his name known abroad as well as at home. The years 1930 and 1931 were significant for many changes. Claude Halstead Van Tyne ('96, Ph.D. Pennsylvania '00), appointed Assistant Professor in 1903, head of the Department of American History in 1906, and head of the Department of History in 1911, died March 21, 1930. A stimulating teacher, a scholar at once careful and imaginative, a brilliant writer, and a vivid and masterful personality, he was a man of mark in the historical field. Though not afraid to oppose even with sarcasm those of his colleagues who held views contrary to his own, he was sympathetic with young men. His standards, nevertheless, were exacting, and he aimed, with the resources available, to build up a really strong department. He was known in France and in England; he gave the Harvard Foundation lectures in the former (1913-14) and the Sir George Watson lectures in the latter (1927). The Watson lectures were embodied in his suggestive *England and America*. Four years previously he had been invited to India to study the workings of the Act of 1919, and published his impressions in *India in Ferment* (1923). Of a long line of works, his two volumes on the *Causes of the War of American Independence* contain the culmination of his scholarship. The second volume, 1929, received the Henry Russel award of the University of Michigan and the Pulitzer prize posthumously. He had been an editor of the *American Historical Review*, a corresponding member of the Massachusetts Historical Society, and a member of the American Academy of Arts and Sciences.

Phillips in the meantime (1929) had resigned. This left two major positions to fill. After a temporary appointment of a visiting lecturer, Dwight Lowell Du-
mond (Baldwin-Wallace '20, Ph.D. Mich-
igan '29) came to take Phillips' work.

He has shown his productivity by publishing a book on *The Secession Movement* (1931) and *Roosevelt to Roosevelt* (1937), and by editing two substantial collections since his arrival. In 1939 he was promoted to a full professorship. In 1930 Verner Winslow Crane ('11, Ph.D. Pennsylvania '15), a former student and one-time instructor in the department (1916-20) but at the time teaching at Brown University, replaced Van Tyne. Crane has been an editor of the *American Historical Review* and is known for his *Southern Frontier, 1670-1732* (1928) and his studies on Benjamin Franklin. Under him a more general course in American history was introduced and the constitutional course was placed in the capable hands of Lewis George Vander Velde ('13, Ph.D. Harvard '31), author of *The Presbyterian Churches and the Federal Union, 1861-1869* (1932). He came as Instructor in 1929, and was promoted to a full professorship in 1940. Since 1935 he has been devoting a portion of his time to assembling original materials relating to the history of the University and of the state and in 1938 was appointed Director of the Michigan Historical Collections.

Perhaps the most significant change in 1930-31 was the substitution of an introductory course known as History of Western Civilization—covering the period from ancient times to the present—in place of the three introductory courses which had been given for nearly twenty years. Although opinion in the department was somewhat divided as to the advisability of the change, the new course was started forthwith. It is now given in four parallel lecture groups, and its success has fully justified the experiment. Boak turned his introductory course, Ancient History, into one for upperclassmen, and the work in modern European history was superseded by new special courses given by various

members of the department. For example, Benjamin Webb Wheeler (California '15, A.M. Harvard '16), who had been Instructor since 1924, was enabled to develop a course in the history of Prussia. Also, the general course in English history was again turned into a course primarily for sophomores and was entrusted to Seaman Morley Scott (British Columbia '21, Ph.D. Michigan '34); he, too, had been teaching in the introductory course since 1924. Wheeler and Scott became assistant professors in 1935.

The members of the faculty of the Department of History in 1940 were as follows: Professors Boak, Aiton, Crane, Hyma, Slosson, Dumond, and Vander Velde; Associate Professors Dunham and Ehrmann; Assistant Professors Scott, Wheeler, Long, and Throop; and Instructors Reichenbach and Stanton, besides five teaching fellows. There were in 1939-40 twenty-two semester courses primarily for undergraduates and twenty-one semesters of work for advanced and graduate students. Included in the graduate work were ten courses continuing throughout the year (two proseminars, a studies course, and seven seminars), as well as one-half of another year seminar, a semester course in historiography, noncredit reading courses, and directed research for doctoral candidates.

Though the William L. Clements Library of American History is described at more length in a separate article (see Part VIII: CLEMENTS LIBRARY), the Department of History must express its deep obligations to that library and to its efficient and accommodating director, Randolph Greenfield Adams. Housed in a magnificent Renaissance building, it was donated to the University and formally opened in 1923, and with the John Carter Brown, Lennox, and Huntington,

ranks as one of the four best existing collections of Americana. During the last ten years previous to his death in 1934, Regent Clements devoted himself to accumulating a remarkable collection of manuscripts supplementing the Sheldburne, Brougham, Croker, and other papers. It includes the Greene, Clinton, Germaine, and Gage papers; all of these are now in the Library.

The publications of members of the history staff, past and present, have been not inconsiderable, and recognition and opportunities for service have come to not a few. Three have received Pulitzer prizes, one the Toppin prize at Harvard, and one the Little, Brown and Company's prize. One has received the Henry Russel award, and one the junior award from the same fund. Two have lectured in foundations in England, one in France, and one in Spain. Four are or have been corresponding members of the Massachusetts Historical Society. One has been president of the American Historical Association, five have been members of the council, four have been on the board of editors of the *American Historical Review*—of whom one was managing editor—one on the board of the *Journal of Modern History*, and one on the board of editors of the *Southern History Journal*. Nearer home, at least three have been presidents of the University of Michigan Research Club; one has been president of the Michigan Schoolmasters' Club, and three have been presidents of the Michigan Chapter of Phi Beta Kappa. Moreover, in a recent survey by the American Council of Education, the University of Michigan Department of History has been rated as one among eight starred for distinction in directing research.

ARTHUR L. CROSS

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THE DEPARTMENT OF JOURNALISM

IT is generally believed that the first course in newspaper writing in the United States was the one instituted at the University of Michigan during the academic year of 1890-91. The course was devised and taught by Fred Newton Scott ('84, Ph.D. '89), Assistant Professor of Rhetoric, under the title of Rapid Writing, and afforded two hours of credit in the Department of English and Rhetoric. The distinctive feature of this pioneering course was its attempt to approximate the conditions of the "city-room" in the preparation of news and editorial "copy."

Rapid Writing was dropped from the curriculum in 1893-94, and no further journalistic instruction was offered until 1903, when the courses in rhetoric were set up as a separate department with Professor Scott as its head. At this time journalism was revived in Rhetoric 13 (Newspaper Writing), a course which was continued, with modest additions, until a special program in journalism was announced in 1916.

The first addition to Rhetoric 13, which was concerned with "theory and practice," was Engineering English 2 (Technical Journalism), in the Department of Engineering, first taught in 1904-5 by Instructor Royal Albert Abbott (Ohio

State '00, A.M. *ibid.* '02) under Professor Scott's supervision. Rhetoric 15 (Reporting and Editorial Work) was added to the curriculum in 1905. This course, open only "to editors and reporters of student publications and those with special permission," was continued the second semester as Rhetoric 16. The following year Rhetoric 13 was taught by Assistant Professor Joseph Morris Thomas ('98, Ph.D. '10) and Rhetoric 15 and 16 were taught by Lewis Burtron Hessler (Pennsylvania '05, Ph.D. *ibid.* '16), Instructor in Rhetoric. In 1907 Professor Scott resumed the teaching of Rhetoric 13 and Professor Thomas assumed direction of Rhetoric 15 and 16 for one year, after which they were dropped.

The 1909-10 *Calendar* of the University contained the following statement (pp. 212-13):

Credit will be granted for work on the student or University publications, provided that such work is elected as regular courses in the Department of Rhetoric and is done under the immediate direction of a member of that department.

The administration of the course in Journalism is entrusted to a standing committee of the Faculty. . . . Upon graduation a special certificate will be given to students who,

in covering the requirements for the Bachelor's degree, shall have completed a program of studies approved by this committee.

This offering was continued until 1916-17, when a special program of study, announced as "Courses in Journalism," increased the studies in journalism from four courses to eight. These courses were taught by Lyman Lloyd Bryson ('10, A.M. '15), who joined the faculty as Instructor in Rhetoric in 1913-14. In the fall of 1917 this special program was under the direction of John Alroy Mosenfelder ('17), Bryson having resigned. In 1918 John Lewis Brumm ('04, A.M. '06), Associate Professor of Rhetoric, took charge of all but the first two courses in journalism, and the following year taught all the courses.

In 1921-22 the Department of Rhetoric became officially known as the Department of Rhetoric and Journalism. The curriculum was increased to twelve courses, and Edwin Grant Burrows (Cornell '13) and Donal Hamilton Haines ('09) were appointed as instructors on the journalism faculty. As Professor of Rhetoric and Journalism, Brumm became the director of the curriculums in journalism.

The expanded curriculums in journalism included the following specialized courses: Elements of Journalism, Interpretative News Writing, Editorial Practice, Special Feature and Magazine Articles, History and Principles of Journalism, Seminar in Newspaper Problems, Newspaper Editing, Newspaper Ethics, Editorial Writing, the Country Newspaper, Written Criticism, and Advertisement Writing. The following year Magazine Writing (Journalism 43 and 44) was added to the list of courses, increasing their number to fourteen.

During the year 1924-25 Wesley Henry Maurer (A.B. Missouri '21, B.S. Public and Bus. Admin. *ibid.* '22, B.J. *ibid.* '22) was appointed to an instructor-

ship in journalism to substitute for Professor Brumm, on academic leave. At this time the course in newspaper ethics was absorbed by the course in newspaper problems. In the fall of 1925 Howard Palfrey Jones (Columbia '21) joined the faculty in journalism, taking the place left vacant by the resignation of Mr. Burrows. Jones continued on the faculty until 1928-29, when, resigning, he was succeeded by Robert W. Desmond (Wisconsin '22). A year later, Desmond accepted an appointment to an instructorship at the University of Minnesota, and Wesley H. Maurer was recalled to the faculty in journalism.

Journalism became a separate department of instruction in the College of Literature, Science, and the Arts in 1929-30, with Professor John L. Brumm at its head. Its offering of courses was again increased to fourteen, each course carrying three hours of credit. In 1932-33 two one-hour orientation courses were added as Journalism 1 and 2. Editorial Direction (Journalism 110) was established in 1935-36, and Specialized Reporting (Journalism 112) was first given in 1936-37.

The professional curriculums in journalism, carrying forty-six hours of credit, now embrace the following seventeen courses: the American Newspaper (two courses), Principles of Journalism, Advanced News Writing, Copyreading and Editing, Special Article Writing, Editorial Writing, Critical Writing and Reviewing, Advertisement Writing, Editorial Policy and Management, the Community Newspaper, Magazine Writing (two courses), Editorial Direction, the Development of American Journalism, Law of the Press, and Special Reporting. The faculty consists of Professor Brumm, Associate Professor Maurer, and Assistant Professor Haines.

Practice in writing and editing the various types of newspaper articles is af-

forded by *The Michigan Journalist*, a weekly publication instituted by Maurer in 1925 and fostered by the Department of Journalism as a laboratory newspaper (see pp. 625-26). Besides the contact with newspapers afforded by the *Michigan Journalist*, which is printed without cost to the University by various newspaper companies in the state, the department maintains relations with editors and publishers through the annual conventions of the University Press Club of Michigan. This professional organization of newspaper workers was instituted by Professor Brumm in 1918 for the purpose of bringing the press of the state and the University into a close relationship of mutual helpfulness. The club, embracing the Associated Press, the League of Small Dailies, and the Michigan Press Association, has a membership of about three hundred editors and publishers.

Broad educational interests, with statewide ramifications, are served through the sponsorship, by the Department of Journalism, of the Michigan Interscholastic Press Association, an organization of high-school editors and their teacher advisers. This group was first brought together by Professor Brumm in 1921. Its annual meetings, covering a period of three days, are attended by some six hundred high-school students and teachers. The purpose of the convention is to foster superior practice in secondary-school journalism and to encourage the delegates to continue their education through college and into the various professional callings.

Education for journalism, as developed at the University of Michigan, embraces approximately one-fourth of the 120 credit hours in a four-year course leading to the bachelor of arts degree in the College of Literature, Science, and the Arts. These specialized courses are restricted to the junior and the senior years. The programs prescribed for the

certificate in journalism include background courses comprising the cultural interests served by literature, languages, and the arts, and the critical interests inhering in the physical and the social sciences.

In dealing with education for journalism, one must realize that there is no such thing as an established and authoritative newspaper practice, in the sense of a rule-of-thumb procedure, as in law or medicine. In the range and the quality of its offerings, journalism is as varied as are individual newspapers. Each publication has its own management, its own editor or editors, its own corps of reporters, its own policy, and its own reading public. But regardless of their differences in personnel and substance, newspapers are alike in the purpose they are presumed to serve—the direction of news and opinion in the interest of public enlightenment. A newspaper, therefore, must be judged by the service it performs as a public intelligencer. It may prove acceptable to large numbers of undifferentiated readers for reasons other than this public service, but as a newspaper it can justify itself on no other grounds.

Journalism, more than any other instrumentality, must furnish the facts on which the judgments affecting the common weal may be formed. The journalist, in this view of a changing social order, will practice the art of compelling a popular interest in matters involving government, industry, science, health, justice, and myriads of other activities and forces that must be controlled and directed for the common good. Uncovering the facts, all the facts that are relevant to an intelligently ordered way of life—this is the responsibility of the professional journalist. And the training for this exacting service cannot be left to chance or to selfish interests, but must be scientifically devised and administered by public education.

It is this power to detect the real news and to record it so that readers shall be interested in it and shall direct their lives intelligently with reference to it that education for journalism seeks to develop in the intending journalist.

JOHN L. BRUMM

THE MICHIGAN JOURNALIST

The *Michigan Journalist*, written and edited by students in the Department of Journalism, was established March 31, 1925, with the publication of Volume 1, Number 1, at the publishing plant of the *Port Huron Times Herald*, through the co-operation of the late E. J. Ottoway, then president of the Times Herald Publishing Company. Suspended during the period immediately following, it was revived in 1929-30 and has continued regularly throughout the ensuing years. From six to ten issues of the newspaper are published at weekly intervals in the second semester of each year by various Michigan newspaper companies. Included among these at various times have been the *Detroit News*, the *Detroit Polish Herald*, the *Pontiac Press*, the *Adrian Telegram*, the *Owasso Argus Press*, the *Monroe Evening News*, the *Lansing State Journal*, the *Ann Arbor Daily News*, the *Birmingham Eccentric*, the *Royal Oak Tribune*, the *Ypsilanti Press*, the *Port Huron Times Herald*, the *Battle Creek Enquirer-News*, the *Trenton Times*, the *Coldwater Reporter*, and the *Washtenaw Post-Tribune*. Ninety-six issues having been published in the thirteen years to 1940. More than 750 students have contributed to its columns, which embrace the work of those in several courses—Editorial Writing, Advanced Newswriting, Specialized Reporting, Copyreading and Editing, Feature Writing, Community Newspaper, and Editorial Direction. Its highly specialized and critical reading public, numbering from 2,600 to 3,000, includes members

of the University faculties, state legislators, Michigan congressmen, newspaper publishers, high-school teachers, heads of scientific and social foundations, and other public leaders and agencies.

The newspaper is distinctive as a teaching device in journalism. It publishes no advertising, and all its articles and editorials are signed by the writers. It has no editorial or news policy, other than the requirement that the written material must be of social significance. All interview sources are expected to approve manuscripts before they are published, a procedure which, although not customary in newspaper work, enlists the co-operation of specialists in the training of future reporters. Since each issue is published at a different newspaper plant, the typographical and mechanical requirements differ, a circumstance which affords students opportunity to learn a variety of practices in composing rooms as they affect editorial procedures. Materials for publication, prepared and edited in Ann Arbor, are mailed to the various publication plants in advance, beginning two weeks before publication—a requirement which demands meticulous and methodical work. Ten to fifteen students accompany instructors to the plant for make-up and final publication details on the date of publication, the field trips providing occasion for conferences with publishers, editors, and superintendents of composing rooms.

Owing to its experimental character, the *Michigan Journalist* is free to develop new news sources and new editorial and newswriting patterns. Since its first issue it has encouraged the interpretative article now becoming widely popular in American journalism. Its editorials and news articles represent a serious effort to report and to interpret trends in social movements and the ideas motivating them. Despite the publication of many articles dealing with controversial sub-

jects, the *Michigan Journalist* has drawn from its readers, for the most part, only kindly constructive criticism, even when there was divergent opinion.

The following references illustrate the nature of the news articles.

Reports of the Federal Trade Commission's cease and desist orders were published as early as April, 1936. More than a page of information concerning the Copeland Food Bill, published March 30, 1934, brought from W. G. Campbell, director of the regulatory work of the Food and Drug Act, the public citation: "The *Michigan Journalist* has published the best piece of publicity that has been produced to inform the public of the necessity for adequate food, drug, and cosmetic legislation." Though issued but a few times each year, the *Michigan Journalist*, by analyzing unpublished engineering reports and presenting startling information on the cost of the hard-water damage to Ann Arbor households, successfully aroused sentiment for a water-softening plant in Ann Arbor.

Reporters and editors of the *Michigan Journalist* made the first detailed study of local tax delinquency in the state, and the report, published May 27, 1933, presented the result of an intensive study by twenty reporters of the city's delinquent taxes. The study was continued until

1936, when the delinquency tax problem became less acute. Following these reports, similar studies were made in other parts of the state, and the argument that the small-home owner would be the beneficiary of proposed legislative concessions to tax debtors was discredited. The pending legislation, calling for cancellation of delinquent taxes, was subsequently defeated.

Studies of public health, such as county health units, a medical economics survey for Michigan, and proposals for state medical clinics, have been reported regularly since 1929.

Experiments in publishing informational reports regarding organized religion are regularly represented in its pages.

Firsthand reports of the coal strike in Ohio from both labor and employer points of view were published in a series of articles beginning May 14, 1932. General working conditions, problems of pay and standards of living, occupational diseases and accidents, unemployment, and old-age pensions were the subjects of reports and editorials.

These references suffice to illustrate the experimental nature of the content and to suggest the type of training such exploration offers the student.

WESLEY H. MAURER

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THE DEPARTMENT OF LATIN

THE "Act to establish the Catholopistemiad, or University, of Michigan," of August 22, 1817, provided for "a *didaxia*, or professorship, of *anthropoglossica*, or literature, embracing all the *epistemiim*, or sciences, relative to language." Three weeks later it was enacted that "in Classical Academies the Pupils shall be instructed in the French, Latin, and Greek languages," and authorization was given for the establishment of the "Classical Academy of the City of Detroit," the first branch of the Catholopistemiad.

On the following Candlemas Mr. Hugh M. Dickie was appointed Instructor of the Academy, and a year later Mr. Ebenezer Clapp was named to the same post at a salary of "not over \$500, such salary to be retained by him out of tuition." In the spring of 1822 the trustees employed the Reverend A. W. Welton in the same capacity. On the first of December, 1825, they extended for one year the contract of Mr. Ashbel S. Wells, a graduate of Hamilton College, who had been "in charge of the Classical department of this institution" for an unnamed period. The salary was increased to \$600 at the same time, but eleven months later, when Mr. Wells resigned, it was \$170.19 in arrears, presumably because of low tuition receipts. Mr. Charles C. Sears, the next incumbent, was hired for \$500, with a guarantee that if the tuition payments did not equal this amount, the trustees would make good the deficit.

Financial difficulties presently made further appointments and guarantees impractical, and the trustees apparently were glad to place the University building at the disposal of any qualified teacher who was willing to provide instruction in return for tuition fees. In

November of 1828, the lower room (English school) of the University was "granted to Mr. Healy . . . for the tuition of scholars in the classics or such other branch or branches of education as may be useful and necessary in the state of the country," and in the following year it was voted by the trustees that when Mr. Hathon should leave the upper room [classical school], Mr. Delos Kinnicutt should be "permitted to occupy it." Finally, on September 1, 1830, the whole building was lent to the citizens of Detroit for the establishment of a common school. Throughout the history of the first institution in Detroit the classical languages had constituted the core of its academic curriculum.

When the University was reorganized in 1837, it was provided, in language much less picturesque than that of 1817, that among the professorships in the Department of Literature, Science, and the Arts there should be "one of ancient languages." In July of 1841, before the University at Ann Arbor opened its doors to students, the Reverend George Palmer Williams (Vermont '25, LL.D. Kenyon '49) was appointed Professor of Languages. For four years he had been principal of the Pontiac branch of the University. He had shown executive ability in this position and had devised the first "Administrative Questionnaire," with the purpose of creating standards for the admission of prospective students. Before a month had passed, during which Professor Williams framed the original entrance requirements to the University, his title was changed to Professor of Mathematics, and the Reverend Joseph Whiting (Yale '23, A.M. *ibid.* '37), principal of the Niles branch, was made Professor of Languages, or, as he

was designated in the first *Catalogue* (1843-44), Professor of Greek and Latin Languages. For four years he served in this capacity. At his death, the first in the faculty, a plot of campus ground was set apart as a University cemetery, and a sum of \$100 was appropriated by the Regents for the erection of a suitable monument. It has not been determined whether any burials were ever made in this cemetery, but Professor Whiting is honored by one of the four inscriptions¹ on the professors' monument, which now stands just east of the University Library.

In September of 1845, the Reverend John Holmes Agnew (Dickinson '23, D.D. Washington College '52) was appointed to succeed Professor Whiting. He did not assume his duties until the following May. In the interval Burritt A. Smith (Yale '44), tutor in Latin and Greek from 1844 to 1846, must have carried the work of the department, with such help as other faculty members could give him. In his first year at Michigan, Agnew served as president of the faculty. Later, as its secretary, he manifested his independence in the historic secret society controversy. On the last day of 1851 the Board of Regents voted to end the services of Agnew and two others at Commencement, apparently in part because of the struggle for the establishment of fraternities and in part because of the pressure exerted by religious groups, which was made more effective by serious dissensions within the faculty itself. In the following August he

was a candidate to succeed himself, but was rejected by a vote of four to three.

The days of Professor Agnew saw the *de facto* separation of instruction in Latin and Greek which was soon to receive official sanction. Since he was unable himself to conduct all the classes in both languages, he chose to hear all the Greek classes, abandoning instruction in Latin. His colleagues in philosophy, Professors Andrew Ten Brook and Daniel D. Wheldon, unwilling to permit the subject to fail, reluctantly assumed the burden.

When asked to suggest a successor to Agnew, Ten Brook proposed his friend James Robinson Boise (Brown '40, Ph.D. hon. Tübingen '68, LL.D. Michigan '68), of Brown University, as Professor of Greek. In August, 1852, Boise was elected Professor of the Latin and Greek Languages, but in December the appointment of a professor of the Latin language and literature gave official recognition to the separation of the two departments and made possible the independent development of the Department of Greek under the able leadership of Professor Boise.

In the *Catalogue* of 1852-53 appeared a remarkable statement, written probably by Boise before the separation of the Departments of Latin and Greek. As evidence of the purposes and spirit of classical instruction at the middle of the last century, it is worthy of being quoted in full. In general, this statement of policy is valid at the present day. It read:

The primary object of this department is to give the student a critical knowledge of the structure of the ancient languages themselves, of the principles of interpretation, and of those rhetorical principles which will enable a person to express himself in idiomatic and perspicuous English. In this department, therefore, nearly as much attention is paid to the study of English as to the study of Greek and Latin. But another and not less

¹ The inscription (south side), now becoming illegible, is as follows: *Memoriae / Josephi Whiting A.M. / Evangelii Ministri / Qui quum / munere Praesidis Academiae Aux. / Universitatis Michiganensis / In exemplum perfunctus est / Tandem / in Ling. Lat. et Graec. cathedram / in eadem Universitate / adlectus fuit / cum singulari omnium ordinum amore / Vixit ann. XLV / Obiit XIII Kal. Aug. / A.D. MDCCCXLV / Procuratores Universitatis / quod solum licuit / hoc marmor / P.C.*

important object which is aimed at, especially in the later studies in this course, is the full comprehension of all that relates to the author read. It is not merely the words and the outward expression of the thought to which attention is directed, but the thought itself; and in connection with this analysis of the subject matter of each author, the age and other circumstances in which he wrote are carefully considered. This leads to a general study of antiquity, the laws, government, social relations, religion, philosophy, arts, manufactures, commerce, education: in short, everything which belonged to Grecian and Roman life. A constant comparison is also made between the ancient and modern world, and especially of the ancient republics, with the peculiar circumstances and history of our own country. It is not for a moment presumed that any one of the above important topics can be fully considered in the brief space allotted to the study of philology, but it is the constant aim of the instructor in this department to give such hints and suggest such inquiries as will lead to the independent investigation and research of the student.

The new Professor of Latin was the Reverend Erastus Otis Haven (Wesleyan '42, A.M. *ibid.* '45, D.D. hon. Union '54, LL.D. Ohio Wesleyan '63), later President of the University. He assumed his new duties at what appears now to have been a propitious moment. President Tappan had just begun his administration and was proclaiming a new university program. This involved, it is true, the recognition of a course of scientific studies, which did not include the classical languages, but also it made provision for the establishment of "university" (i.e., graduate) courses. Among the first university courses to be announced was one in the Latin language and literature. Haven appears not to have accepted this invitation to expand the Latin program, but to have devoted much of his time to the teaching of rhetoric and, especially, history. Wisdom undoubtedly dictated his transfer in

1854 to the chair of history and English literature.

To fill the vacancy thus created, Boise suggested, and, on June 29, 1854, the Regents appointed, Henry Simmons Frieze (Brown '41, LL.D. Michigan '85) of Brown University. He began his work the following October, and continued to direct the fortunes of the Department of Latin for three and a half decades. In many ways the developments in the department reflected the character of the man. He was gentle and shy, but a capable administrator, an excellent teacher, and a competent scholar at a time when classical studies had not become highly specialized. Above all, he was a true humanist, with an extraordinary range of interests. His devotion to music is recorded elsewhere (see Part I: FRIEZE ADMINISTRATION). His lectures on painting, sculpture, and architecture, which were eagerly attended, laid the foundation for the Department of Fine Arts. It is not surprising that to a man of his fine sensibilities Latin was more than a stone on which to whet students' minds. President Angell, who had been his pupil in an Eastern preparatory school, spoke thus of his experience in the classes of Professor Frieze (*Reminiscences*, p. 17):

Contact with this inspiring teacher formed an epoch in my intellectual life, as in that of so many other boys. He represented the best type of the modern teacher, at once critical as a grammarian and stimulating with the finest appreciation of whatever was choicest in the classic masterpieces. At first, as we were showered with questions such as I had never heard before, it seemed to me, although the reading of the Latin was mainly a review to me, that I should never emerge from my state of ignorance. But there was such a glow of enthusiasm in the instructor and the class, there was such delight in the tension in which we were kept by the daily exercises, that no task seemed too great to be encountered. Though in conjunction with our reading we devoured the Latin grammar

so that by the end of the year we could repeat almost the whole of it, paradigms, rules, and exceptions without prompting, the work of mastering it did not seem dry and onerous, for we now felt how the increasing accuracy of our knowledge of the structure of the language enhanced our enjoyment of the Vergil and the Cicero, whose subtle and less obvious charms we were aided by our teacher to appreciate.

On assuming his duties at the University of Michigan, Frieze undertook a policy of expansion by extending the program in Latin into the senior year. In 1855 he received a leave of absence for travel in Europe for the express purpose of obtaining materials for a classical museum, and Benjamin Braman (Brown '54) was employed as his substitute for 1855-56 with the title of Professor of the Latin Language and Literature. In 1858 Frieze returned with a collection of statuary and other works of art which formed the nucleus of the Museum of Art and Antiquities, of which he was long the curator. He next evinced his concern with the question of secondary education by publishing a series of recommendations for the preparatory course in Latin, and then helped to establish a new course in the second semester of 1858-59 called the Teachers' Class in Ancient Languages, "for the benefit of those who may wish to prepare themselves for teaching in Union and High Schools." This is reputed to have been the first teachers' course offered in the United States and with modifications of title and content has been given uninterruptedly to the present day. Also in that year the subject matter of the graduate course in Latin was first indicated. This course was entitled Latin Literature and dealt with the Roman satirists.

The paucity of suitable textbooks, particularly for use in preparatory schools, led Professor Frieze to undertake, during the closing years of this decade, the edit-

ing of Vergil's *Aeneid*. Labor of love though it was, this task demanded of him a difficult sacrifice. "So passionately was he devoted to music," wrote Professor Andrew White in his *Autobiography*, "that at times he sent his piano away from his house in order to shun temptation to abridge his professional work, and especially was this the case when he was preparing his edition of Vergil." This book, which was printed in 1860, enjoyed wide popularity and ran through several editions, the last of which was a revision made in 1902 by Professor Walter Dennison. Further to meet the needs of his classes, Frieze produced in 1865 his edition of the tenth and twelfth books of the *Institutes* of Quintilian.

Because of expansion in the program of the department and the increase in the number of students, Fitch Reed Williams ('58, A.M. '69) was appointed Instructor in Latin in 1858, and in 1860 Adam Knight Spence ('58, A.M. '61) was added to the staff as Instructor in Greek, Latin, and French. After serving the department three years, Spence confined his attention to Greek and French, and later to French alone. Williams later entered politics and became a state senator; Spence was called to the presidency of Fisk University.

In 1863 Charles Kendall Adams ('61, A.M. '62, LL.D. Chicago '79, LL.D. Harvard '86), later to attain distinction as a historian and as president first of Cornell University and then of the University of Wisconsin, was engaged as Instructor in Latin and History, to assist Professor Frieze. At the beginning of his fifth year the history classes demanded his full attention, and the place thus left vacant was filled by the appointment in 1867 of Martin Luther D'Ooge ('62, LL.D. '89, Ph.D. Leipzig '72, Litt.D. hon. Rutgers '01) to an assistant professorship of ancient languages. On January 1, 1868, Boise, who had admirably

administered the Department of Greek, became a member of the faculty of the University of Chicago, and D'Ooge was made Acting Professor of Greek. To make possible the necessary redistribution of courses in the two departments, Edward Lorraine Walter ('68, Ph.D. Leipzig '77), then a senior Latin student and later to become head of the Department of Modern Languages, was employed as an assistant in Latin.

The earliest statement of specific entrance requirements to the University (*R.P.*, 1837-64, p. 183) provided, among other things, that candidates must sustain an examination in "the Grammar of the English, Latin, and Greek Languages, the Exercise and Reader of Andrews, Cornelius Nepos, Vita Washingtonii, Sallust, Cicero's Orations," and other subjects. By 1848, the *Catalogue* shows, the *Vita Washingtonii* and Sallust had been replaced by Vergil's *Bucolics* and six books of the *Aeneid*, and in the following year the *Bucolics* was omitted, and all twelve books of the *Aeneid* were required. As early as 1852 the requirements in Latin had become what they were to remain, except for short intervals, until well into the next century, namely, Latin grammar, Caesar's *Commentaries*, Cicero's *Select Orations*, six books of the *Aeneid* or the equivalent, Latin composition, and Greek and Roman geography. For some reason not now apparent these requirements were reduced in 1855 to all of Caesar's *Commentaries* (on the Gallic Wars, presumably) and one book of Vergil, but were gradually restored during the succeeding decade to the standard of 1852.

The introduction in 1852 of a scientific course, in which no study of the ancient languages was required, seems to have had little immediate effect upon the work in Latin, for the popularity of the traditional classical course was not diminished. The Latin program appears to

have been excellent, with courses in almost all of the more important Latin authors and with lectures on Latin literature, Roman history, and antiquities. Frieze was deeply interested in the expanding field of archaeology, and in the *Regents' Proceedings* were recorded several appropriations of money for the purchase of pictures for the Departments of Latin and Greek. The large panorama of the city of Rome, which has engaged the attention of many generations of students and is now mounted on the wall of one of the lecture rooms (2003 Angell Hall), was secured in March, 1864.

The decade 1870-79 was marked, especially toward its close, by continued growth of the University and by the enlargement and strengthening of the Department of Latin. Frieze's duties as President pro tempore from 1869 to 1871 placed added responsibility upon Assistant Professor Walter, which was further increased when he was acting head of the department during the absence of Frieze between 1871 and 1873. The "broad and scholarly character of his teaching" received special mention in the *President's Report* for 1874. In that year he left for three years of study and travel in Europe. Upon his return in 1877 with the degree of doctor of philosophy, he resumed his connection with the Department of Latin, but in 1879 he became Professor of Modern Languages and Literatures, and in this field made his richest contribution to the University.

In 1875 Elisha Jones ('59, A.M. '62) left the superintendency of the Ann Arbor schools and joined the staff as Acting Assistant Professor of Latin in the absence of Professor Walter. On the return of the latter from Europe, Jones was transferred to the Department of Greek, but he became Assistant Professor of Latin in 1879, when Walter accepted the professorship of modern languages. In 1878-79 Calvin Thomas ('74, A.M. '77,

LL.D. '04), an instructor in modern languages who later gained renown as Professor of the Germanic Languages and Literatures, first at Michigan and then at Columbia, gave instruction in Latin. In the following year, under the auspices of the department, he gave the first course in Sanskrit to be offered at this University.

There were no great changes in the program of the Department of Latin during this decade. The *Calendar* of 1873-74 announced that "the Roman pronunciation of Latin has been adopted at Michigan, as previously in the universities of England and at Harvard and Cornell." For a number of years Frieze had offered courses in Latin to be included in the program for the degree of master of arts. These were in the Roman satirists in the first semester and in the epistolary writings of Pliny the Younger and the works of Seneca in the second semester. In addition to these courses, the *Calendar* of 1874-75 announced as courses for postgraduate students Seneca's Prose Works and Lactantius. One of the practical difficulties which confronted the department is illustrated by the statement, in the *President's Report* for 1878, that a course in the thirty-fourth and thirty-fifth books of Pliny's *Natural History* (on the history of art) had been announced for the preceding year but had been withdrawn because no suitable edition of the text was available.

In the *President's Report* of 1870, written by Professor Frieze, an effort to improve standards of instruction in the secondary schools was mentioned. In conformity with general University policy, the admission requirements in Latin were subsequently increased to include the whole of Vergil's *Aeneid* or its equivalent. Frieze, in the same report, also wrote with approbation of the liberalizing of the college curriculum by the introduction of nonclassical programs of study,

stating that it would avoid the "false and foolish antagonism, which elsewhere has been provoked between classical and scientific studies." In President Angell's report of 1872 it was stated that there were sixty senior Latin students in that year, and that the combined enrollment in the classical course and in the Latin and scientific course was 65 per cent of the total enrollment of the Department of Literature, Science, and the Arts, which at that time included the Department of Engineering. Angell observed that students in the Latin and scientific course often transferred, if able, to the classical course, and that a certain proportion of those in the scientific course likewise transferred to the Latin and scientific course. After referring to these conditions, he said (p. 7):

Those timid friends of classical learning who have feared that it would be abandoned in our colleges, if scientific studies were admitted to equal honor with the classical, and those scientists who suppose that there is no real and intelligent demand for classical training, especially in the West, may with equal profit scrutinize these figures.

The change in policy brought about in the last two years of the decade, by which courses required for a degree were largely limited to the first two years of a student's program and the work of the last two years was made mostly elective, adversely affected the enrollment in advanced Latin classes. Apparently Frieze endeavored to counteract this result by further developing the courses then offered in antiquities. In 1879 he prepared a catalogue of the Museum of Art and stated in the *President's Report* (p. 32):

In the lectures on Classical Art and Antiquities, our means and material of illustration have been found painfully deficient [The collection] has received but very small accessions, and is quite inadequate to the proper illustration of a complete course of lectures. . . . A university which lacks

apparatus of this kind, must be considered imperfectly equipped.

From 1880 to 1882, during President Angell's absence in China, Frieze was again Acting President. In the work of the department he was chiefly assisted by Elisha Jones, who was made Associate Professor in 1881. Although Jones had been trained by Frieze, his scholarly interests were concerned largely with the niceties of language structure, rather than with the broader aspects of classical culture. He was therefore known best by the students whom he drilled, but the love and devotion with which he labored won him the respect of everyone. He was a masterly teacher, a slight, frail man, commonly known as "Shorty" Jones, and the sobriquet bore a goodly measure of affection. His *Greek Prose Composition* (1872), *First Lessons in Latin* (1877), and *Latin Prose Composition* (1879) went through several editions and were widely used in secondary schools throughout the United States, contributing much to the improvement of elementary instruction in the classics and drawing favorable attention to the University. Had he lived to finish his work on an edition of selections from the correspondence of Cicero, there would be more tangible evidence of his refined scholarship and of his ability as a teacher of college students.

In 1880 Charles Mills Gayley ('78, LL.D. '04, LL.D. Glasgow '01) was added to the staff as an instructor, and four years later he became Acting Professor of Latin. He was a vigorous and very popular teacher. Though his connection with the department lasted only six years, his name has been known to the many generations of students who have sung "Laudes atque Carmina" and "The Yellow and the Blue," for which he composed the words.

Andrew Cunningham McLaughlin ('82, '85), LL.D. '12), after a year as Instructor in Latin, was transferred in 1887 to

the Department of History. The rather surprising number of such exceptional teachers transferred from the Department of Latin to other departments during the earlier history of the University is evidence of the thoroughness of training and the consequent versatility of students within the less highly diversified curriculum of the period. There is no doubt that some of these changes were prompted by the popularity of the instructors and by the hope that they would lure students to elect courses in the newer and less highly esteemed departments to which they had been transferred. It was no slight contribution which the Department of Latin thus made to the general interests of the University.

In the death of Professor Jones, on August 16, 1888, the Department of Latin suffered a heavy loss. That Professor Frieze, who had been strongly attached to him, was deeply moved by his death, is apparent in the affectionate tribute which he prepared for the *Michigan Argonaut* of October 20, 1888:

As to Professor Jones, never has the University had an officer more free from faults, more respected and loved both by his colleagues and by the students under his charge. And my peculiar relations with him will justify me in saying thus publicly, that never in my life, whether in trial or prosperity, have I had a more true and self-forgotten and devoted friend.

During the decade which closed with 1889, further variety was given to the courses in Latin. This change was made possible partly by the development of the elective programs for junior and senior students, and partly by the publication of suitable texts of works not previously available for study. Jones introduced a special course in Plautus, also courses in Martial's *Epigrams* and Cicero's *Letters*. Gayley was the first to offer Catullus, Tibullus, and Propertius, and in 1885 Frieze gave a course in Lucretius

for the first time. From 1887 to 1889 the course in Sanskrit, which had been offered by Calvin Thomas every year since 1879, was taught in the Department of Latin by Walter Miller (A.M. '84, LL.D. Arkansas '16), who was transferred from an instructorship in Greek to one in Latin in 1887 and the next year became Acting Assistant Professor of Latin. The popularity of the Latin courses continued during the eighties, and it was necessary to provide four sections of the freshman classes.

An almost complete change in the staff of the Department of Latin occurred in the year 1889-90. Early in the first semester Frieze found it impossible to meet his classes regularly because of poor health. When he felt that he had recovered sufficiently he attempted to resume his teaching. It was apparent, however, that his strength was failing, and he died on December 7, 1889. He was deeply mourned, for he had won the genuine affection of students and faculty alike. He had long served as Dean of the Faculty of the Department of Literature, Science, and the Arts, having been returned each autumn to this office, which was then elective. His resting place in Forest Hill Cemetery is marked by a beautiful and dignified monument, a replica, in all save the inscription, of the sarcophagus of one of the great Scipios. It was thus that alumni and colleagues sought to express their love for one of the finest men Michigan has known.²

It is possible that Professor Frieze had some previous intimation that his work was nearing its close. Knowing that Joseph Horace Drake ('85, Ph.D. '00, '02), who had become an instructor in the department in 1888, was to be

abroad for a period of study, he sought another assistant, and, impressed by his scholarship and his interest in music, selected Francis Willey Kelsey (Rochester '80, Ph.D. hon. *ibid.* '88, LL.D. *ibid.* '10) to become Professor of Latin in 1889-90. Kelsey's vigor and enthusiasm won him immediate acclaim, and on Professor Frieze's death he was made head of the department.

The task which Professor Kelsey undertook was to develop graduate work in Latin upon the excellent foundation of undergraduate study which had been laid by his predecessor; this involved the further task of providing an adequate library. The deficiency of the classical section, even for undergraduate work, had been realized by the students, one of whom referred in the *Chronicle* to the generosity of Professor Frieze, who had placed his private collection of books on art and archaeology in the Library for the use of his classes. Professor Kelsey found even the policy of the Library discouraging, since books were not freely placed at the disposal of students. When he insisted that certain volumes be made available to his advanced classes, he gained his point only after giving a guarantee that he would himself replace any books which might be lost. It has been said that he taught the University the proper use of the Library; certainly his efforts were influential in effecting a change in its regulations and in assembling an excellent collection of books for classical studies.

John Carew Rolfe (Harvard '81, Ph.D. Cornell '85) was called from Harvard in 1890 as Assistant Professor of Latin. In 1892-93 Kelsey had leave of absence, and Rolfe, as Acting Professor, directed the department, to which Joseph Drake had returned as Assistant Professor. In 1893, Henry Arthur Sanders ('90, Ph.D. Munich '97) and Clarence Linton Meader ('91, Ph.D. '00) were appointed

² The full inscription is as follows: Henry · Simmons · Frieze / Professor · of · Latin · in · the · University · of · Michigan / MDCCCLIV · MDCCCLXXXIX / Candidior · Animam · Terra · Non · Tvlit / This · Monument · Was · Erected · by · the · Alumni · of · the · University · in · Affectionate · Remembrance

instructors in Latin. Both were to be associated with the department for many years. While Professor Rolfe was on leave in 1896-97, his place was taken by Assistant Professor Emory Bair Lease (Ohio Wesleyan '85, Ph.D. Johns Hopkins '94), later to be associated with the College of the City of New York and widely known among American classical scholars. At the same time, William Henry Wait (Northwestern '79, Ph.D. Allegheny '88), who had come to the Department of Greek the preceding year, was made Instructor in Greek, Latin, and Sanskrit. Walter Dennison ('93, Ph.D. '98) became Instructor in Latin in 1897. Meader spent the year 1897-98 in Rome and Greece as fellow of the American School of Classical Studies and the following year at Munich. In the fall of 1899 Sanders returned as Instructor after several years of study abroad.

The decade which thus closed was remarkable for the growth in the department and for the many changes, both in personnel and in the courses introduced. The number of freshman sections had increased from four to seven. The first doctor of philosophy degree in Latin and Greek was granted in 1891, the first in Latin in 1892. Six candidates had received the doctor's degree and twenty-three the degree of master of arts when the decade ended.

Professor Kelsey, at the very beginning of his administration, introduced a course called Methods, Province, and Scope of Classical Philology and in both semesters offered a course called Seminary in Latin Philology. He also gave a course designated Seminary in Roman Archaeology: Topography and Architectural History of the City of Rome, and Sculpture and Painting in the Roman Period. Later, he added a museum course in archaeology, and seminars in the study of Roman coins and lamps and the critical examination of

the *Rhetorica ad Herennium*. Rolfe instituted the course in Latin inscriptions. Drake first gave one entitled Seminary in Roman History in 1893-94 and another new course, Introduction to Roman Constitutional Antiquities, three years later. In 1893-94 Meader offered a course in the *Institutes* of Gaius and Justinian, and the following year he was made Lecturer on Roman Law in the Department of Law while continuing as Instructor in Latin. During his absence in 1898-99 Professor Drake was vested with this lectureship. Assistant Professor Lease gave a course in Christian Latin, and Mr. Dennison offered Introduction to Latin Paleography. With few exceptions and with minor modifications in title these courses have been successfully continued to the present day, for the benefit of graduate and advanced undergraduate students. The courses in Greek and Roman political history, a subject which had been taught in the language departments from their very inception, were eventually transferred to the Department of History. Sanskrit was offered throughout most of the decade by one of the instructors in Latin and Greek.

Professor Kelsey was on leave for the year 1900-1901, and the department was directed by Professor Rolfe, aided by Assistant Professor Drake and four instructors, one of whom also taught Greek and Sanskrit. In 1902 Rolfe accepted a professorship of the Latin language and literature in the University of Pennsylvania, a position which he occupied with distinction until his retirement, and Walter Dennison, who had accepted an associate professorship of Latin at Oberlin College in 1899, returned to the department as Junior Professor of Latin. John Garrett Winter (Hope '01, Ph.D. Michigan '06), who was later to become head of the Department of Latin, was appointed Instructor

in Greek and Latin in 1906, but conducted courses chiefly in the Greek Department. In 1898 Drake, while retaining his position in Latin, was appointed Lecturer in Roman Law in the Department of Law. In 1906 his title was changed to Professor of Latin, Roman Law, and Jurisprudence, and in 1908 to Professor of Law, thus terminating his membership in the Latin Department. At the same time Albert Robinson Crittenden ('94, Ph.D. '08) was added to the staff on temporary appointment, and two years later became Assistant Professor of Latin.

The first decade of the century was marked by an attack upon University traditions which had most serious effects upon the Department of Latin. As early as 1880 it had been necessary for the president to take cognizance of a complaint that too great emphasis was being placed upon classical studies, for in his report he called attention to the fact that classical languages were not required for admission to the University or for graduation from it. It was nevertheless true that most students coveted the bachelor of arts degree, and that for this degree training in both Greek and Latin was still demanded. Both departments of the classical languages vigorously opposed any change which would deprive this degree of its traditional meaning and rob it of the respect which it commanded. After years of agitation, however, the faculty followed the example of other institutions and voted, early in 1901, to grant but one degree, that of bachelor of arts, to all graduates of the Department of Literature, Science, and the Arts. Two other changes which were logically implied in this action were the recognition of the assumed equality of all courses, resulting in a system of almost completely free electives, and the abandonment of differentiated entrance requirements. The University is still struggling to re-

duce the chaos which ensued upon the revolution of 1901.

In the Department of Latin the effects were immediate and appalling. The enrollment in freshman Latin, which had steadily increased until 1901, dropped from seven sections to five in 1901-2, and to four sections in 1905-6, probably representing a loss of more than one-half in the number of students, since, with a declining enrollment, the sections were doubtless smaller. There was some compensation in the improved quality of work which was possible in the freshman and sophomore classes after the weak and uninterested students had transferred to other departments. It was also noticeable that a somewhat larger proportion of students continued in the Department of Latin in their junior and senior years. Thus for some time the more advanced courses were not seriously affected by the changes in requirements for admission and graduation. It was possible even to increase their number, for the decrease in freshman and sophomore sections had reduced teaching schedules to a point which made the addition of new courses feasible. Kelsey now gave lectures on the antiquities of Pompeii and developed the course in Roman archaeology into two courses. Denison gave a course called the Private Life of the Romans and introduced another, named Marcial and Petronius' *Banquet*, with Special Reference to Private Life. Drake gave a general course in Roman literature in English and expanded his work in Roman law. Sanders gave Vergil's *Georgics* and, later, a course entitled Lectures on the Sources of the Roman Historians, and Meader, following his work with Wölflin, introduced the study of the Caesarian *Bellum Africum* and *Bellum Hispanicum*, and in 1904 first announced a course in comparative linguistics, a study to which his attention was henceforth increas-

ingly directed until the time of his retirement from teaching in 1938. The addition of advanced courses was not disproportionate to the increase in the number of graduate students. From 1900 to 1910, fifty-seven candidates received the master of arts degree in Latin and twelve that of doctor of philosophy, eleven in Latin and one in Greek and Latin, and of this number nearly all had received their undergraduate training within the department.

The announcement of the new general entrance requirements, specifying a minimum of two years of Latin, French, or German, was attended by a definition of two units in Latin, followed by the statement: "This preparation is not sufficient to enable the student to enter Latin classes in the University." In 1904 this pronouncement was supplemented by the words, "but arrangements are made whereby students who present two or three units may make up full entrance requirements under private instruction." In the *Calendar* of the next year this statement was replaced by the single sentence: "N.B. This preparation is sufficient to enable the student to enter Latin A or B in the University." There followed, in its proper place, an announcement of these two courses, similar to high-school courses of the third and fourth years and hitherto regarded as preparatory, but carrying full college credit from that date. By anticipation it may be added that in 1910, in response to a demand that the needs of premedical and predental students be more adequately supplied, two courses in elementary Latin were announced. Since they were not recognized as college courses, and no credit was given for them, every student was charged a tutoring fee of \$10 for each course until 1927, when, by faculty action, elementary Latin was placed on the same basis as other elementary language courses. The College

of Literature, Science, and the Arts had expanded downward to include all of the secondary school's courses in Latin.

Dennison once more, in 1910, withdrew from the department, going to Swarthmore College, where he served as a professor of Latin until his death in 1917. His place was not immediately filled, but in 1911 Instructor John G. Winter, most of whose courses had been in the Department of Greek, was made Assistant Professor of Ancient Languages. Miss Orma Fitch Butler ('97, Ph.D. '07) began her long service to the department in 1912, as an assistant in Roman archaeology. During Kelsey's absence in 1919-20 James Eugene Dunlap (Ripon '10, Ph.D. Michigan '20) served as Instructor in Latin.

The decade which thus ended was one of severe trials. The department had hardly succeeded in adapting its program to the changes of the preceding decade when, in 1912, the Department of Literature, Science, and the Arts attempted to prevent certain abuses of the elective system by imposing "group requirements" for graduation and a limitation upon the amount of work which a student might elect in any one group (see Part II: OFFICE OF THE REGISTRAR). The mandatory diversification of program made it almost impossible for a Latin student to gain the necessary familiarity with Greek and also the practical acquaintance with both French and German which was required and indispensable for research leading to the degree of doctor of philosophy. Thus, the effect of the new legislation upon the Department of Latin was to prevent it from giving its own students the preparation for graduate work which had hitherto been regarded as essential. Henceforth the doctor's degree was more frequently conferred upon students whose undergraduate work was done in other institutions.

The Department of Latin was also affected adversely by the World War. Since it had little to offer toward the immediate solution of those questions which so completely occupied the attention of the world, its courses attracted a smaller number of students. This was likewise true of Latin in secondary schools, which were preparing a thin crop for subsequent transplanting, with results to be mentioned later.

Kelsey's leave of absence of 1919-20 was renewed for 1920-21, when Dr. Butler was also given leave of absence to assist him in projects which he was developing in Mediterranean lands. Bruno Meinecke (Tennessee '08, Ph.D. Michigan '22) served as Assistant Professor during this year, then left for Hope College, where he served on the faculty for six years. Kelsey was planning further excavation abroad in the interests of the department, and in anticipation of his absence Dunlap, who from 1920 to 1923 had taught at Indiana University, was recalled as Assistant Professor of Latin and Greek. Another instructor was added to the staff, and George Robert Swain ('97, A.M. '14), who had held an assistantship in the department from 1914 to 1917, was appointed teaching assistant in Latin and technical expert in photography. In 1921-22 Professor Winter was on leave of absence for a year of study and travel abroad.

With the establishment of the University High School in 1923, Wilbert Lester Carr (Drake '98, A.M. *ibid.* '99) was called from Oberlin College as Associate Professor of Latin and of the Teaching of Latin, and head of the Department of Latin in the new school, and the courses in pedagogy which had been taught by Professor Crittenden were now transferred to the School of Education. In 1925 Dr. Meinecke returned to the University and introduced

courses in medical Latin and in Medieval Latin.

For many years Meader had devoted his time largely to the teaching of Russian and general linguistics. John Henry Muyskens ('13, Sc.D. '25), Instructor in French, began to assist in the phonetics instruction in 1921 and four years later was appointed Assistant Professor of Phonetics in the Department of Latin. He continued to serve in this department until 1932, when the courses in general linguistics and phonetics were incorporated in the Department of Speech and General Linguistics.

Early in 1927 Kelsey returned from Europe in poor health. He attempted to resume his duties as head of the department, but soon entered the hospital, where his death, on May 14, 1927, ended a service to the University which had extended over nearly four decades. Through all this period he had maintained the vitality and energy which had characterized him on his first arrival on the campus in 1889. He was an exacting but inspiring teacher. His devotion to the welfare of the department and its members was untiring and unselfish. Like Professors Frieze and Jones, he brought wide recognition to the University by his publication of texts, particularly his school editions of selections from Cicero and of Caesar's *Commentarii de Bello Gallico*, which were used from coast to coast. So popular was this edition of Caesar that upon one occasion, when Kelsey was to make a public address in Denver, he was introduced as "the man who wrote Caesar's *Gallie War*." His zeal in promoting sound instruction in the classics led him to maintain close relations with the secondary-school teachers of Michigan. He was similarly active and influential in several national associations and did much to foster high ideals of scholarship. In 1904 he started the Humanistic Series of the

University of Michigan Studies, which has brought renown to the University throughout the world. By his own efforts he secured money for the publication of the earlier volumes, and he was editor of the series until his death. Through the response to his appeals for help, the work upon the great *Thesaurus Linguae Latinae*, which German scholars could no longer support after the World War, was saved from abandonment. His most widely known scholarly work was the volume, *Pompeii: Its Life and Art*, based upon the work of Professor Mau; his greatest contribution to classical scholarship was his effective fostering of scholarly ideals and institutions. He pointed the way which the Department of Latin must follow for years to come.

At the death of Professor Kelsey, Professor Sanders was designated as acting head of the Department of Latin, and he continued in this capacity through the next year, 1927-28. The proposed reorganization of the College, which was under discussion at this time, made adjustments within the department doubly difficult. As the year approached its close, Sanders accepted an appointment as director of the American School of Classical Studies in Rome and received an extended leave of absence from the University. By unanimous request of the members of the department, Professor John G. Winter was appointed to succeed him in the task of administration.

Winter's administrative ability had previously been recognized by President Little, and in 1928 he assumed his position as head of the Department of Latin, Professor of the Latin Language and Literature, Director of the Museum of Classical Archaeology, and Director of the Division of Fine Arts. He reorganized the Museum and obtained for it the use of Newberry Hall, thus fulfilling the dream of Professor Frieze. To provide

more adequately for instruction in archaeology, which had been one of Professor Kelsey's principal interests, Benjamin Dean Meritt (Hamilton '20, LL.D. *ibid.* '37, Ph.D. Princeton '24) was called from the assistant directorship of the American School of Classical Studies in Athens to be Associate Professor of Latin and Greek. He revived certain courses in archaeology which had been omitted from the *Announcements* for several years, and Dr. Butler taught a course in numismatics. During the year 1929-30 Winter held the lectureship of the Thomas Spencer Jerome Foundation in the American Academy in Rome.

The decade which closed in 1930 was one of varied fortunes. In the early years the adverse effects of the World War upon enrollments were a cause of serious concern. Then an increase in the size of classes began, which continued almost to the end of the period. These changes may be illustrated by the enrollment variations in two senior courses, the Teachers' Course in Caesar and the Teachers' Course in Vergil, which were each given in two large sections in 1913-14. In 1923-24 the numbers had fallen to one section of scarcely a dozen students, but in the following year they began to rise, reaching a maximum in 1928-29, when thirty-eight students were enrolled in each course.

Of equal significance was the development of new interests by members of the staff. During his absence in 1919 and subsequent years, Kelsey had supervised excavations in Antioch of Pisidia, had assisted in exploratory excavations at ancient Carthage, and had initiated the University's archaeological work in Egypt on the site of the old town of Karanis in the Fayum. He also arranged for the purchase of numerous Greek and Latin manuscripts and for the acquisition of papyri recovered from the sands of Egypt. A full account of these efforts

and of their very important results is recorded elsewhere (see Part VIII: ART AND ARCHAEOLOGICAL COLLECTIONS). Here it is sufficient to state that they added stimulus to instruction in archaeology and gave new direction to the research interests of various members of the Departments of Latin and Greek, making possible the remarkable scholarly achievement of this decade and of the one to follow.

When Winter returned in 1930, Carr had resigned from the faculty to accept a position in the Teachers' College of Columbia University, and the vacancy thus created had been filled by the appointment of Fred Sylvester Dunham ('06, A.M. '07), of the Cleveland Public Schools, as Assistant Professor of Latin and of the Teaching of Latin, and head of the Department of Latin in the University High School.

After an absence of three years, Sanders returned to the department in the fall of 1931 as Professor of Latin. In the following year he was also named Chairman of the Department of Speech and General Linguistics, in which were incorporated the courses in phonetics and linguistics which had been developed under the direction of Meader. At the time of this reorganization Meader's long service to the Latin Department was ended by his transfer to the staff in speech and general linguistics. He had contributed much, especially in the organization of new courses, and many generations of students recall with pleasure the hours spent in his classes.

Meritt was given leave of absence for 1932-33 to be visiting professor at the American School of Classical Studies in Athens, after which he resigned and accepted a professorship in the Johns Hopkins University.

On December 17, 1933, Albert R. Crittenden died, after a very brief illness. For more than a quarter of a century he

had been a quiet but effective teacher in the department, and his loss was a severe blow. He had revived the course in Roman law a few years after Professor Drake had withdrawn from the department and had provided for the needs of his classes by publishing, in 1928, *Readings in Roman Law*. Professor Emeritus Drake returned to the teaching of Latin to conduct these classes until the close of the year.

In 1934 Meinecke became Associate Professor and Frank Olin Copley (Stanford '30, Ph.D. *ibid.* '34) was appointed Instructor in Latin. Clark Hopkins (Yale '17, A.M. Oxon. '21, Ph.D. Wisconsin '24) was called to the University in 1935 to be Associate Professor of Greek and Latin. He had been field director of Yale University's excavations at Dura-Europos in Syria and was thus able to continue and develop the courses in archaeology in addition to his teaching of Greek and Latin authors.

As the year 1937-38 was drawing to its close Assistant Professor Butler became too ill to continue her work and died shortly after, on June 16. Her twenty-five years of teaching and of labor on the archaeological collections had ended. In the minutes of the faculty this tribute was paid to her:

Loyalty to friends, devotion to work, and interest in her students were dominant traits in her character. The simple dignified words found in so many of the Latin inscriptions on which she worked may be appropriately applied to a life which, like hers, deserves remembrance: *Bene merenti*.

In the fall of 1938 Enoch Ernest Peterson (Luther '12, A.M. Michigan '32) a member of the staff of the Museum of Classical Archaeology, assumed Assistant Professor Butler's laboratory course in antiquities and the course in numismatics. At the same time Roger Ambrose Pack ('29, Ph.D. '34), who had been appointed Acting Instructor in Latin and

Greek in 1936, joined the staff as an instructor.

At the end of the first semester of 1938-39 Professor H. A. Sanders, who had reached the age of retirement, became Professor Emeritus of Latin, more than forty-six years after his first appointment in 1893. His unremitting industry in varied scholarly pursuits, but especially in the study of old Biblical texts, has brought distinction to himself and to the University. He has been a shrewd counselor in the affairs of the department and a kindly adviser to its younger members. His insistence upon high standards of scholarship and his courageous defense of the interests of the department have commanded the respect of all his colleagues.

In less than two decades preceding 1940 there was a complete change in the staff of the department except for its present head, Professor J. G. Winter. To him has fallen the difficult task of maintaining the high standards of teaching and of scholarship set by his predecessors. His associates look forward with confidence to the decade which lies before them.

The years 1930-40 have witnessed more clearly than any preceding period the unfortunate results of the confusion which has developed in secondary education. In the high schools there have been an unparalleled influx of pupils (many of them of inferior ability), a resulting shift of emphasis in instruction toward vocational preparation, and a too prevalent abandonment of definite standards of achievement. These factors have affected the department in various ways. Fewer students enter the University with the traditional four years' preparation in Latin, and it has been necessary to give added attention to those courses in the department which were formerly regarded as preparatory to college work. Enrollments in the senior courses are

correspondingly smaller than in the preceding decade.

Fortunately, the graduate courses of the department have attracted superior students from an ever widening area which extends beyond the borders of the United States. In the decade ending in 1940 the master of arts degree was conferred upon 189 students in Latin. Seven received the degree of doctor of philosophy in Latin, and six received the same degree in Latin and Greek.

Summer courses were first organized in 1894 and were principally of undergraduate character. Gradually the demand for graduate courses increased, and those designed for undergraduates attracted fewer students until in the early twenties it was no longer practicable to include in the summer program courses for which graduate credit was not given. The number of students seeking advanced degrees through summer work in the department has grown larger, with only an occasional downward fluctuation. During the five years ending in June, 1935, 219 students were enrolled in summer courses in Latin, and in the next five years the number was 303. The University's program in the classical languages is now unsurpassed by any in the country. Two institutes for teachers of Latin have been held during the summer session and have enrolled teachers from Maine to California, and from the Gulf states to the Canadian border. At no time in its history has the Department of Latin been more widely recognized than it is at present.

Recognition must here be given to the generosity of Mr. Theodore D. Buhl, of Detroit, in establishing the Buhl classical fellowships in 1901, and to Mrs. Theodore D. Buhl and her son, Mr. Lawrence D. Buhl, in continuing them. In a period of forty years more than fifty graduate students have been recipients of these fellowships, to many of whom the

continuance of their studies would otherwise have been impossible. In addition to six members of the present University faculty who are occupied in teaching or research in the classics, former Buhl classical fellows are known to be engaged in teaching or administrative work in the University of North Dakota, But-

ler University, Pomona College, Southwestern University, the University of Illinois, New York City College, Luther College, Colby College, Sweet Briar College, Indiana University, the Michigan State Normal College, and other institutions of similar standing.

JAMES E. DUNLAP

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THE DEPARTMENT OF LIBRARY SCIENCE*

THE University of Michigan, after giving instruction in librarianship in the summer session for many years, opened in the autumn of 1926 a Department of Library Science as part of the undergraduate curriculum in the College of Literature, Science, and the Arts. Four years later the requirements for admission were changed to put the work of the Department of Library Science on a strictly graduate basis.

The Department of Library Science has restricted the numbers of its students, particularly in recent years, to a small and compact group of high academic standing. It has aimed to train a

comparatively small number of especially selected students rather than to seek to attract considerable numbers.

The department has been extremely fortunate in its faculty. Margaret Mann, Associate Professor Emeritus since 1939, and Associate Professor Eunice Wead (Smith '02, A.M. Michigan '27) have been connected with the department since its beginning. During its first year, Sydney Bancroft Mitchell (McGill '01, A.M. *ibid.* '04), of the University of California, held the professorship at Michigan. He was succeeded by Associate Professor Carleton B. Joeckel (Wisconsin '08, Ph.D. Chicago '34, B.L.S. New York State Lib. School '10), who later went to the University of Chicago. Joeckel was succeeded by Harland Ab-

* Reprinted, in slightly revised form, from *The Library Journal*, 62 (1937): 27.

bott Carpenter (Boston '25, B.S.L.S. Columbia '28), who in turn was followed by Cecil John McHale (Carleton '22, A.M. Harvard '25, A.B.L.S. Michigan '29).

In 1938 the Carnegie Corporation gave the department an endowment of \$150,000 (later increased to \$200,000). Rudolph H. Gjelsness (North Dakota '16, B.L.S. Illinois '20) was called from the University of Arizona to take an endowed chair thus provided and was afterward promoted to the chairmanship of the department. Katherine Elizabeth Schultz (Smith '18, A.M.L.S. Michigan '34) was appointed Assistant Professor in 1939, succeeding Associate Professor Mann. In addition to the three full-time members of the staff, the department has drawn since its beginning on the staff of the University Library for instruction in the regular academic year. In its early years Francis L. D. Goodrich ('03, B.L.S. '16, A.M. '16), the Associate Librarian, and later his successor, Samuel Wilson McAllister ('16, A.M. '22, B.S.L.S. Columbia '28), had charge of a few courses. R. H. Gjelsness, when he was Assistant Librarian, Edward Henry Eppens (B.D. Yale '96), the chief classifier, and Edith Thomas ('14), the head of the Library Extension Service, have likewise been members of the faculty of the department. In each summer since 1927 the summer session has drawn to the city of Ann Arbor teachers of library science from other institutions and librarians of distinction.

In the first fifteen years of the department's existence, 739 degrees in library science were conferred—538 bachelor's, 200 master's, and 1 doctor's.

The department is definitely integrated with the work of the University in both the College of Literature, Science, and the Arts and the Graduate School. The department does not exist as a separate educational unit, as do most university library schools. Admissions to the department and the work of students conform in every respect to the rigid and exacting conditions laid down by the University for work beyond the first bachelor's degree.

While a number of the graduates of the Department of Library Science have gone into public library work, it is noteworthy that the majority of them are to be found in college and university libraries and in libraries of research institutions. This is only natural, in view of the close connection between the University Library and the Department of Library Science, which operated under a single director until 1940.

The department has had an unusual number of students from abroad, particularly from Italy and New Zealand.

In earlier years definite efforts were made to train librarians for high schools in Michigan and the surrounding states. The courses furnishing such training had to be curtailed because of reductions in income owing to the prevailing economic crisis.

WILLIAM W. BISHOP

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THE DEPARTMENT OF MATHEMATICS

I. THE HISTORY OF THE DEPARTMENT

WHEN the seven young men who constituted the first student body came to Ann Arbor in the fall of 1841 to enter the newly organized University of Michigan, one of the two professors who welcomed them was the Reverend George Palmer Williams (Vermont '25, LL.D. Kenyon '49), Professor of Mathematics. To this year may therefore be assigned the birth of the Department of Mathematics.

Professor Williams, who was thirty-nine years old at that time, had had a varied teaching experience as principal of the preparatory school at Kenyon College, Ohio, for four years, and as a teacher of ancient languages in Western University of Pennsylvania and at Kenyon College for six years. He came to Ann Arbor from Pontiac, where he had been principal of the University's Pontiac branch since 1837 (see Part I: BRANCHES). When the first class graduated in 1845 Professor Williams, as President of the Faculty, gave the members their diplomas.

The history of the Department of Mathematics may be divided into four periods, the first extending from the entrance of the first class in 1841 to the appointment of Edward Olney in 1863, the second to the death of Professor Olney in 1887, the third to the death of Professor Beman in 1922, and the fourth to the present time.

THE FIRST PERIOD, 1841-63.—For a number of years after 1843 George P. Williams was listed in the annual *Catalogue* as Professor of Natural Philosophy and Mathematics. The total enrollment in the 1840's was so small that he was able to conduct all of the classes in both of these subjects, but as the University attracted more students it became

necessary that his burden of teaching should be divided. Two professorships were formed from his chair in 1854, and his title was changed to Professor of Mathematics. In 1854-55 there were sixty-three freshmen—almost as many students as were in the other three classes combined. The following year Williams was assisted in mathematics by Alexander Winchell, then Professor of Natural History, and William G. Peck, Professor of Physics and Civil Engineering. In May, 1856, William Petit Trowbridge (U. S. Mil. Acad. '48, Ph.D. hon. Princeton '79, LL.D. Michigan '87) was also appointed Professor of Mathematics, but he served for only one year, and later had a distinguished career in engineering. One of the University's own graduates, John Emory Clark ('56, A.M. '59), was Assistant Professor of Mathematics for the following two years. During the remaining four years of the period Williams was assisted by James Craig Watson ('57, Ph.D. Leipzig '70, LL.D. Columbia '77). Watson, a gifted mathematician, was only twenty-one years old when he became Instructor in Mathematics and temporary Professor of Astronomy in 1859. He later brought fame to Michigan as Professor of Astronomy and Director of the Detroit Observatory (see Part III: DEPARTMENT OF ASTRONOMY).

In this early period the work in mathematics included algebra and geometry in the freshman year, and plane and spherical trigonometry and some analytical geometry and calculus in the sophomore year. The books used, Davies' translations of Bourdon's *Algebra* and Legendre's *Geometry*, Davies and Loomis' *Trigonometry*, Loomis' *Analytical Geometry*, and Loomis' *Differential and Integral Calculus*, give some idea of the ground covered in the early courses. The

new University soon showed its broad-minded attitude toward education by providing a scientific course parallel with the classical course. As early as the year 1854-55 the number of freshmen in the scientific course exceeded the number pursuing the classical course, this year marking the beginning of the popularity of the new course. The number of upper-classmen who had chosen it was only eleven—less than one-sixth of the enrollment in the junior and senior classes. The curriculum for students enrolled in the scientific course included an additional term of calculus and such applied subjects as surveying, navigation, descriptive geometry, and drawing and architecture.

Even in these very early days extensive plans were in mind for a more advanced development:

UNIVERSITY COURSE

This Course . . . for those who have taken the degree of Bachelor of Arts or . . . Bachelor of Science . . . when completely furnished with able professors and the material of learning, will correspond to that pursued in the Universities of France and Germany. (*Cat.*, 1852-53, p. 26.)

A skeleton outline of the proposed course lists twenty subjects of study, in which higher mathematics occupies the seventh place. The first step toward a realization of this more advanced program was signaled by the appearance, in the *Catalogue* of 1856-57, of a list of books for reference. In the higher mathematics mention was made of Church's *Analytical Geometry*, Church's *Differential and Integral Calculus*, Courtenay's *Calculus*, and Peirce's *Curves and Functions*.

In the *Catalogue* of 1858-59 appeared the announcement of a "Programme of Studies for the Degrees of A.M. and M.S." Professor Williams offered further work in calculus, and Assistant Professor Clark offered courses in the same pro-

gram—Higher Algebra; Calculus, which proposed to give a general view of definite integrals, differential equations, including the theory of singular solutions, and partial differential equations; and Method of Variations. It is interesting to speculate what the results might have been if Assistant Professor Clark had remained to perfect this ambitious program.

With a staff consisting of Professor Williams and Instructor Watson it was inevitable that the emphasis during the remaining four years of this first period should be on applied mathematics. Watson, in addition to his instructorship in mathematics, was Professor of Astronomy in 1859-60 and then for three years was Professor of Physics. He offered as Physics in the graduate program analytical mechanics and the mathematical theory of heat, light, and sound.

THE SECOND PERIOD, 1863-87.—The fall of 1863, with the departure of Brünnow as Professor of Astronomy and the appointment of Edward Olney (A.M. hon. Madison University '53, LL.D. Kalamazoo '73) as Professor of Mathematics, marks the beginning of the second period. Watson became Professor of Astronomy and Director of the Detroit Observatory, and Williams, Professor of Physics, a position which he held until 1875. From that year until his death in 1881 he was Professor Emeritus.

At the opening of the second period Professor Olney and one instructor constituted the staff. Olney was thirty-five years old when he came to the University to take charge of the work in mathematics. He was not a college graduate, but had educated himself while working on a farm. He had served five years as principal of the Perrysburg Union School in Perrysburg, Ohio, and for ten years had held the chair of mathematics in Kalamazoo College. During his first two years at the University of Michigan Ol-

ney was assisted by Allen Jeremiah Curtis (Kalamazoo '60, A.M. Michigan '61), who had been his colleague on the Kalamazoo College faculty. At the University Curtis was an instructor in both mathematics and rhetoric. He was succeeded in 1865 by William Butler Morgan (Haverford '53, A.M. *ibid.* '57, Michigan '63e), who remained only one year and taught civil engineering as well as mathematics. Then for five years George Benjamin Merriman (Ohio Wesleyan '63, A.M. Michigan '64), Assistant Professor of Mathematics, divided the classes with Professor Olney. Merriman had studied law and had been admitted to the bar. In 1871 he left the department, but continued in the University, in the Department of Physics, through 1874-75. During a part of the time that Merriman taught in the Department of Mathematics Mark Walrod Harrington ('68, A.M. '71, LL.D. '94), an instructor, gave a part of his time to the subject, though his interests were rather in the natural and physical sciences. He definitely entered the fields of geology and biology in 1872 and was later a noted astronomer and meteorologist (see Part III: METEOROLOGY and DEPARTMENT OF ASTRONOMY).

In 1871-72 Merriman was replaced by three instructors—Wooster Woodruff Beman ('70, A.M. '73, LL.D. Kalamazoo '08), Edward Laurens Mark ('71, Ph.D. Leipzig '76, LL.D. Michigan '96), and Marcus Baker ('70, A.M. '76, LL.B. Columbian University '96). Of these, Beman was the only one who remained, Mark leaving after one year and Baker after two.

The staff took on greater permanence during 1874-75, for Olney and Beman, who now became an assistant professor, were joined by Charles Nelson Jones (Oberlin '71), and these three, with the addition of an occasional assistant or instructor, constituted the staff of the

department for the remaining thirteen years of the period.

The undergraduate curriculum in mathematics at the beginning of this second period was much like that which had obtained from the earliest days. In the classical course there were plane geometry and trigonometry in the first semester of the freshman year, algebra in the second; plane analytical geometry and differential calculus in the first semester of the sophomore year, and solid geometry and integral calculus in the second; in the junior year there was physics, supplemented by spherical geometry and spherical trigonometry. The curriculum in the scientific course devoted more time to calculus and included descriptive geometry and analytical mechanics. Ray's *Plane and Solid Geometry* and Ray's *Algebra*, Part II, replaced some of the earlier texts, and soon some of Olney's own books came into use.

The *Catalogue* for the year 1867-68 contains the following description of the work in mathematics (pp. 63-64):

The course pursued in Pure Mathematics has reference both to intellectual training and the acquisition of practical knowledge. Ray's text-books in Elementary Geometry and Algebra were used in the Freshman year. During this year the student is kept pretty close to the methods of the author; but much stress is laid upon the solution of problems and the performance of all practical exercises tending to promote thoroughness and independent thought. In the Sophomore year, while text-books are used, a part of the course is given by lectures in order to give greater breadth of view, and to develop in the pupil the power of investigation, by following out suggestions made by the lecturer. For General Geometry and Calculus Loomis' class-book is used. In the Scientific courses Davies' Analytical Geometry and Davies' Descriptive Geometry and Warren's Perspective Drawing are used on their several subjects.

Ample provision is made for those who wish to pursue a more extended course of

Mathematical studies, by allowing them to substitute mathematical for other studies, according to the preceding synopsis of the Courses of Instruction. In this way the Geometry, Infinitesimal Calculus, Calculus of Variations, and the Calculus of Finite Differences may be pursued as far as students may desire.

The *Catalogue* for the following year gives a detailed outline (p. 51), listing with great detail the topics included in the various courses:

VI.—Pure Mathematics Classical Course

FRESHMEN.—*Geometry*, Problems in construction, Review of Properties of Triangles, Polygons, Plane Areas, Solid and Spherical Geometry; *Algebra*, Quadratics, Ratio, Proportion, Progressions, Theory of Indeterminate Coefficients, Binomial Theorem and its application to the development of Functions, Theory and Use of Logarithms, Indeterminate Analysis, and the Elements of the Theory of Equations.

SOPHOMORES.—*Trigonometry*, Plane and Spherical; *General Geometry*, Construction of Equations, Production of Equations of Plane Loci, transformation of Coördinates, and the Properties of the Conic Sections; *ELECTIVE; Calculus*, Differential, including Differentiation of Functions of a Single Variable, McLaurin's and Taylor's Theorems with Binomial Theorem and Theory of Logarithms deduced, Maxima and Minima of Functions of a Single Variable, Radius of Curvature, and the Elementary Principles of Tracing Curves; *Integral*, Elementary Forms, Binomial Differentials, Rectification and Quadrature of Plane Curves, and Surfaces and Volumes of Solids of Revolution.

For the students who took the scientific course there were added topics in algebra: resolution of cubic equations and a more complete view of the theory of equations, including Sturm's theorem and Horner's method of resolving numerical higher equations.

In the civil engineering course there was a further requirement:

JUNIORS.—*General Geometry*, Polar Coördinates, Lines, Planes and surfaces in Space including Surfaces of the 2d Order; *Calculus*, Differential including Functions of Several Variables with a fuller view of the Theory of Curves, and Integral including Functions of two Variables and Special Processes.

When these descriptions were rewritten for the *Catalogue* of 1872-73, it was possible to mention Olney's *Treatise on Special or Elementary Geometry*, Part III, and Olney's *Algebra*, Part III, which had recently appeared, as indicating the ground covered. These texts were fairly complete, beginning with first principles. The Part III in each case embraced the topics especially fitted for university work. The ideal that Olney had in mind for college work in mathematics and for the appropriate high-school preparation is clearly set forth in the following paragraph from the Preface of his *Geometry*:

Part III, which is contained only in the *University Edition*, has been written with special reference to the needs of students in the *University of Michigan*. Our admirable system of public High Schools, of which schools there is now one in almost every considerable village, promises ere long to become to us something near what the German Gymnasias are to their Universities. In order to promote the legitimate development of these schools, it is necessary that the University resign to them the work of instruction in the elements of the various branches, as fast and as far as they are prepared in sufficient numbers to undertake it. It is thought that these schools should now give instruction in Elementary Geometry, which has hitherto been given in our ordinary college course. The first two parts of this volume furnish this amount of instruction, and students are expected to pass an examination upon it on their entrance into the University. This amount of preparation enables students to extend their knowledge of Geometry, during the Freshman year in the University, considerably beyond what has hitherto been practicable. As a text-book for

such students, Part III has been written. At this stage of his progress, the student is prepared to learn to investigate for himself. Hence he is here furnished with a large collection of well classified theorems and problems, which afford a review of all that has gone before, extend his knowledge of geometrical truth, and give him the needed discipline in original demonstration. To develop the power of independent thought, is the most difficult, while it is the most important part of the teacher's work. Great pains have therefore been taken, in this part of the work, to render such aid, and *only such*, as a student ought to require in advancing from the stage in which he has been following the processes of others, to that of independent reasoning. In the second place, this part contains what is usually styled *Applications of Algebra to Geometry*, with an extended and carefully selected range of examples in this important subject. A third purpose has been to present in this part an introduction to what is often spoken of as the *Modern Geometry*, by which is meant the results of modern thought in developing geometrical truth upon the direct method. While, as a system of geometrical reasoning, this Geometry is not philosophically different from that with which the student of Euclid is familiar, and which is properly distinguished as the *special* or *direct* method, the character of the facts developed is quite novel. So much so, indeed, that the student who has no knowledge of Geometry but that which our common text-books furnish, knows absolutely nothing of the domain into which most of the brilliant advances of the present century have been made. He knows not even the terms in which the ideas of such writers as Poncelet, Chasles, and Salmon, are expressed, and he is quite as much a stranger to the thought. In this part are presented the fundamental ideas concerning *Loci, Symmetry, Maxima and Minima, Isoperimetry, the Theory of Transversals, Anharmonic Ratio, Polars, Radical Axes*, and other modern views concerning the circle.

Olney was a master of clear exposition, and the influence of his books was widespread among the high schools of the region.

The *Calendar* of 1878-79 shows a considerable advance in the direction of our present practice. For the first time, all courses were listed by number and the number of recitations per week was stated. The list (p. 31) follows:

FIRST SEMESTER

1. Advanced Algebra. Four times a week.
2. General Geometry and Calculus. Four times a week.
3. Advanced General Geometry and Calculus. Five times a week.
4. Determinants. Once a week.

SECOND SEMESTER

5. Advanced Geometry; Plane and Spherical Trigonometry. Four times a week.
6. General Geometry and Calculus. Four times a week.
7. Modern Geometry and Trilinear Coordinates. Twice a week.
8. Calculus of Variations. Twice a week, first half of semester.
9. Quaternions. Twice a week, second half of semester.

In 1879-80 a two-hour course in trigonometry and a four-hour course in analytical mechanics were added, and the following statement appeared (p. 33):

It is proposed to add a two years' course of Mathematical reading as soon as there shall be a sufficient demand for it, in such standard works as Salmon's *Higher Algebra*, Frost's *Solid Geometry*, Doctor's *Determinants*, Todhunter's or Price's *Integral Calculus* and Taite's *Quaternions*.

Two years later this reading course was listed as Course 17, and Scott's *Determinants* and Routh's *Rigid Dynamics* were mentioned among the suggested books. The course in analytical mechanics was extended to two semesters, the second being devoted to dynamics. Two-hour courses in advanced algebra and geometry were also added, but these represented rearrangements of work already given with but little new subject matter. In 1885-86 the course in geometry was extended to two semesters, and included

synthetic projective geometry. It was, however, a course intended for freshmen. A two-hour course in the elements of the theory of functions, including elliptic functions, was added, completing the list of courses offered in 1886-87, the end of the second period.

Professor Olney was well aware that the department, to do effective work, must be provided with library facilities and other equipment. The inadequate library appropriations permitted few additions to the small group of mathematical books included in the original 3,700 bought in Europe by Asa Gray. The records show that in 1881 Olney addressed the Board of Regents on the needs of the Department of Mathematics, recommending the purchase of additional textbooks. Crelle's *Journal* was mentioned as being particularly needed. An appropriation of \$500 was made for the purchase of the complete set of this *Journal*, but the appropriation was not used, for Mr. E. C. Hegeler, of La Salle, Illinois, placed the same amount at Professor Olney's disposal for this purpose. On two earlier occasions Olney had asked for funds to procure means of illustration in his department and had been granted \$50 in 1864 and \$70 in 1865. Some of the models included in the department's collection were doubtless part of these early purchases.

Two circumstances point to the conclusion that the work in mathematics was exacting in those early times: Professor Olney was commonly known among the students by the nickname of "Toughy," and in November, 1880, the Board of Regents found it desirable to pass a resolution directing an investigation of the subject, as follows:

Resolved, That the Literary Faculty be requested carefully to examine as to the amount of time required by the students to prepare their mathematical recitations, and to see that these studies do not interfere with

others equally important and necessary to a course of liberal education. (*R.P.*, 1876-81, p. 609.)

THE THIRD PERIOD, 1887-1922.—Upon the death of Professor Olney, Associate Professor Beman was promoted to a professorship in mathematics and Assistant Professor Jones was named Professor of Applied Mathematics. With these changes the department entered the third period. Jones held his position only during 1887-88.

By the following year, 1888-89, of the three who had constituted the staff for the last twelve years Beman alone remained; with him were associated as instructors Alexander Ziwet (C.E. Karlsruhe Polytechnic School '80), Charles Puryear (Richmond '81, B.S.[C.E.] Virginia '85, LL.D. Daniel Baker Coll. '14), and Frank Nelson Cole (Harvard '82, Ph.D. *ibid.* '86), the first doctor of philosophy to have a place on the staff. Both Cole and Ziwet took an active part in the New York Mathematical Society, their names appearing as authors of reviews in the first volume of its *Bulletin*. Some of the instructors appointed in these years remained only a short time, but the staff was gradually acquiring a more stable character. The appointments that proved more permanent were those of Joseph Lybrand Markley (Haverford '85, Ph.D. Harvard '89) and Elmer Adelbert Lyman ('86, LL.D. Berea College '18) in 1890, Arthur Graham Hall ('87, Ph.D. Leipzig '02) in 1891, James Waterman Glover ('92, Ph.D. Harvard '95) and Edwin Charles Goddard ('89, '99) in 1895, and William Henry Butts ('78, Ph.D. Zurich '07) in 1898. Cole left in 1895 to accept a professorship in Columbia University. In 1898 Lyman went to Michigan State Normal College.

The year 1899-1900 closed with the staff made up of Professor Beman, Junior Professor Ziwet, Assistant Professor Markley, and four instructors—Hall,

Glover, Goddard, and Butts. Goddard had been studying law at the same time that he was Instructor in Mathematics.

The next few years witnessed a remarkable growth in the staff; there were so many changes that it seems desirable to record by name only those instructors who were later promoted. Walter Burton Ford (Harvard '97, Ph.D. *ibid.* '05) came as Instructor in 1900-1901. In 1901-2 Junior Professor Ziwet was placed in charge of mathematics for engineering students, a step which initiated the gradual separation of the work in mathematics into two distinct departments (see Part VII: DEPARTMENT OF ENGINEERING MATHEMATICS). The three instructors added in 1903-4 who remained more than the one year were: Archie Burton Pierce (California '90, Ph.D. Zurich '03), Theodore Rudolph Running (Wisconsin '92, Ph.D. *ibid.* '97), and Peter Field (Minnesota '96, Ph.D. Cornell '02). Louis Charles Karpinski (Cornell '01, Ph.D. Strassburg '03) and John William Bradshaw ('00, Ph.D. Strassburg '04) were appointed instructors in 1904-5, and in the same year Ziwet was made a professor. Of those who later advanced in the department, one was added as an instructor in each of the next four years—Clyde Elton Love ('05, Ph.D. '13) in 1905-6, Louis Allen Hopkins (Butler College '05, Ph.D. Chicago '14) in 1906-7, Vincent Collins Poor (Kansas '01, Ph.D. *ibid.* '15) in 1907-8, and Frank Howard Stevens (Chicago '08) in 1908-9. Markley became a full professor in 1907. Butts, though continuing to teach mathematics in the Literary Department, became Assistant Dean in the Department of Engineering in May, 1908. Pierce was transferred to the civil engineering staff in the autumn. At the same time Bradshaw dropped his administrative work (see Part II: OFFICE OF THE REGISTRAR), and Arthur G. Hall, who had been a member of the mathe-

matics faculty for several years before 1903, returned to the University as Professor of Mathematics, Registrar of the Department of Literature, Science, and the Arts, and Editor of University Publications. Several promotions having been made, the staff in 1908-9 consisted of four professors, two junior professors, five assistant professors, and nine instructors.

Theophil Henry Hildebrandt (Illinois '05, Ph.D. Chicago '10) came as Instructor in 1909-10, and Carl Jenness Coe ('09, Ph.D. Harvard '29) in 1910-11. In 1911 Glover was promoted from an associate professorship to a full professorship of mathematics and insurance.

The following five men joined the staff in the next five years: Louis Joseph Rouse (Princeton '08, Ph.D. Michigan '18) and Tomlinson Fort (Georgia '06, Ph.D. Harvard '12) in 1913-14, Alfred Lewis Nelson (Midland College '11, Ph.D. Chicago '15) in 1915-16, Harry Clyde Carver ('15) in 1916-17, and Rainard Benton Robbins (Indiana '09, Ph.D. Harvard '14) in 1917-18. Meanwhile, in 1914-15, the title of junior professor was changed to that of associate professor. In 1915-16 Stevens was transferred to the Department of Engineering Mechanics, and Hopkins accepted, in addition to his teaching duties, the position of Secretary of the Colleges of Engineering and Architecture. In 1917-18 Ford was named Professor of Mathematics, and Tomlinson Fort accepted a position at the University of Alabama. William Wells Denton ('07, Ph.D. Illinois '12) came as Instructor in the fall of 1918, and between 1919 and 1921 Field, Karpinski, Butts, and Running were promoted to professorships. Norman Herbert Anning (Queen's University '05, A.M. *ibid.* '06) came as Instructor in 1920-21. The following year, there were ten professors, four associate professors, seven assistant professors, and fifteen instructors.

Because of the practice of introducing new courses, often with but slightly modified content, and of giving them new numbers, the list of courses in 1886-87 presents a very confused picture: Courses 10, 12, and 15, which together covered much the same ground as Course 5, were for freshmen, but Courses 2 and 3 were more advanced. In 1887-88 a partial renumbering somewhat improved the situation.

Beyond a good two-year program in trigonometry, analytical geometry, and elementary calculus, only four courses were offered besides the reading course. These were the five-hour course Analytical Mechanics, a two-hour course called Modern Algebra, Differential Equations, a two-hour course, and the three-hour course designated Quaternions. There were eight freshman sections handled by the two instructors; Professors Beman and Jones took care of the other courses. With the coming of Dr. Cole in 1888-89 two new two-hour courses were offered, Mathematical Theory of Elasticity and Elements of the Theory of Functions.

Changes in textbooks and in the names of courses were also made soon after Professor Beman took charge of the department; the term "general geometry," introduced by Olney, disappeared. Olney had a strong antipathy to the name "analytical geometry," as he maintained that its method was no more analytical than that of the so-called "synthetic geometry." He distinguished "special" or "elementary" geometry, which deals with the properties of a particular curve, especially the circle, from "general" geometry, which treats of the common properties of curves and develops methods applicable to the investigation of all curves. The latter is aptly illustrated by the solution of the problem, to find the tangent at a given point on any curve.

Beman did not care to retain this terminology. He accepted the use of the

prevalent name of "analytic geometry," and soon replaced Olney's texts, especially with those of English authors. C. Smith's *Treatise on Algebra*, his *Conic Sections* and *Solid Geometry*, Loney's *Trigonometry*, Williamson's *Calculus*, and Edwards' *Integral Calculus for Beginners* were in use in the nineties. A little later, Beman, in collaboration with David Eugene Smith, published a series of texts, but these were for secondary schools—no books of college grade were included.

Two years were sufficient to demonstrate that the new numbering of courses was not satisfactory, and a complete revision took place in 1889-90. Courses in trigonometry, algebra, analytic geometry, calculus, and analytical mechanics were numbered consecutively from one to six, with modifications indicated by an appended "a"; elective courses bore the numbers from seven to thirteen inclusive. Among these we find but one new course, one of two hours in modern geometry. The changes of the next two years merely lengthened courses already included in the list. The University had been empowered to grant the teacher's certificate in 1891, but long before that some of the departments had been giving teachers' courses, and as early as 1880 the teacher's diploma was awarded in certain subjects.

In 1892-93 the department, recognizing its responsibility for the preparation of teachers for the secondary schools, introduced two courses for teachers—Teachers' Seminar in Algebra and Teachers' Seminar in Geometry. There were 128 Michigan high schools on the accredited list of the University in 1893. These teachers' seminars included a review of the content of high-school courses with occasional reference to more advanced points of view, together with a few lectures on the history of mathematics. Each student was expected to write a criticism of some text selected from Pro-

fessor Beman's large collection. To one who was willing to undertake the task, a text in a foreign language was assigned.

New courses offered in the years that followed included Fourier Series and Spherical Harmonics, Theory of Substitutions, Partial Differential Equations, Theory of Numbers, Theory of Invariants, and Theory of the Potential.

The present statistical and actuarial work in the department began in 1902-3, when Glover offered three courses in the theory of annuities (see p. 654).

Before the close of the third period, January, 1922, there were other developments in the curriculum. Professor Ziwet, Professor Field, and others worked out a series of courses in applied mathematics—Vector Analysis, Hydrodynamics, and Theory of Elasticity. Professor Ford offered a course in infinite series and products, and another in topics in the theory of divergent series. The teachers' courses were elaborated, and separate courses were introduced in the history of mathematics, graphical methods, and celestial mechanics.

The physical equipment of the department was greatly increased during Professor Beman's administration. During his first year he addressed a letter to the Board of Regents, asking for an appropriation of \$500 to buy models and supporting his request by reference to Professor Olney's generosity in turning back into the general fund the appropriation of an equal amount for the purchase of Crelle's *Journal*. This request was granted, and the purchases made at that time constitute most of the collection of models now in the possession of the department.

THE FOURTH PERIOD, SINCE 1922.—Professor Beman began the year 1921-22 in apparently good health, but an attack of arthritis compelled him to turn over his classes to others and was the cause of

his death on January 18, 1922. He had completed fifty years of active service as a member of the faculty. Professor Markley was appointed Chairman of the Department of Mathematics in 1922. He directed its affairs until 1926, when, because of failing health, he resigned the chairmanship, but continued teaching for another year before his retirement.

Several important changes in the staff occurred during the chairmanship of Professor Markley. In 1922-23 two instructors came, Ruel V. Churchill (Chicago '22, Ph.D. Michigan '29) and Cecil Calvert Craig (Indiana '20, Ph.D. Michigan '27). Bradshaw and Hildebrandt became professors in 1923-24, and Assistant Professor Robbins left to take a position with the New York State Insurance Department. James Alexander Shohat (Magister of Pure Mathematics, Petrograd '22) came as Instructor in 1924-25. After a long and painful illness, Professor Hall died on January 10, 1925 (see Part II: OFFICE OF THE REGISTRAR). Assistant Professor Nelson resigned in 1925 to accept a professorship in the College of the City of Detroit. Ben Dushnik ('24, Ph.D. '31) and Walter Otto Menge ('25, Ph.D. '31) began as instructors in 1925-26, the year in which Alexander Ziwet was made Professor Emeritus, Love was promoted to a professorship, and Field was appointed Chairman of the Department of Mathematics in the College of Engineering.

In the spring of 1926 James W. Glover became Chairman, and immediately set himself to the task of revivifying the department. No new major appointment had been made since the death of Professor Beman, and at first the University attempted to secure a man of national reputation as professor. The attempt having proven unsuccessful, it was decided to add several promising younger men to the staff. In the year 1926-27 three assistant professors were

appointed—James Andrew Nyswander (California '13, Ph.D. Chicago '24), George Yuri Rainich (Magister of Pure Mathematics, Kazan '13), and Raymond Louis Wilder (Brown '20, Ph.D. Texas '23). At the close of that year Markley became Professor Emeritus.

By resolution of the Regents in 1928 the Department of Mathematics in the College of Literature, Science, and the Arts and the Department of Mathematics in the College of Engineering were reunited under the chairmanship of Professor Glover. William Dowell Baten (Baylor '14, Ph.D. Michigan '29) was added as an instructor in the fall of 1928. Alexander Ziwet died on November 18, 1928, and Joseph L. Markley a little more than a year later, April 19, 1930. In 1929-30 two new assistant professors were appointed—William Leake Ayres (Southwestern '23, Ph.D. Pennsylvania '27) and Arthur Herbert Copeland (Amherst '21, Ph.D. Harvard '26). Also in that year Assistant Professor Shohat resigned.

Professor Glover was absent on leave during the two years 1930-32 in order to devote his time to the Teachers Insurance and Annuity Association, of which he was president, and Field was Acting Chairman of the department. Glover, upon his retirement from the chairmanship in the fall of 1934, was named Edward Olney Professor of Mathematics, a distinction conferred in recognition of his services to the University and to the department. T. H. Hildebrandt was designated as his successor. At the beginning of the year the department lost Assistant Professor Denton.

During the five years 1935-40 the following changes in the staff took place: Glover and Ford retired and were named professors emeritus, and Associate Professor Menge and Assistant Professor Baten left the University; Carver, Wilder, and Rainich were appointed

to full professorships; Copeland and Churchill became associate professors; and Edwin Wilkinson Miller ('26, Ph.D. '30), Sumner Byron Myers (Harvard '29, Ph.D. *ibid.* '32), and Paul Sumner Dwyer (Allegheny '21, Ph.D. Michigan '36) were appointed assistant professors. At the close of the academic year 1939-40 the Department of Mathematics had a staff of nine professors, seven associate professors, seven assistant professors, and eleven instructors.

When the most recent period in the history of the department began in 1922, all the main branches of mathematics were represented by courses. The additions to the staff made possible extension in the fields of topology, differential geometry and relativity, modern algebraic theory, and probability. The number and variety of graduate courses has been increased, and the use of the seminar method has been extended. The most striking characteristic of this period has been the emphasis placed upon research and graduate work. This is reflected in the number of doctor's theses written. Although only eleven doctor's degrees had been conferred up to 1922, seventy-four were conferred in the eighteen succeeding years. Increased interest and activity in mathematical research on the part of members of the staff have naturally accompanied this growth. Other activities of the department have not been neglected. Not only is there adequate provision for those whose interest is along mathematical lines, but the increased need of mathematics in other fields has called for expansion in courses of interest primarily to engineering students and in courses in actuarial science and in mathematical statistics and their applications. The Department of Mathematics is growing not only by furthering its own interests but also by serving the needs of other departments.

JOHN W. BRADSHAW

II. COURSES IN ACTUARIAL MATHEMATICS

In this country university courses in the theory of probability, up to the beginning of this century, were largely confined to the solution of questions of a priori probability, that is, throwing of dice, drawing of cards, tossing of coins, and employment of combinations, permutations, substitutions, and the like, to find the numerator and denominator of the fraction expressing the required chance. This approach to the subject was the natural outcome of adherence to English texts and acceptance of the practices of the British school of mathematicians.

The first volume of *Biometrika* appeared in 1901-2, but it was a long time before the English and Scotch actuaries knew much about the new methods of approach used by Karl Pearson and his followers. The application of the methods of empirical probability to important practical problems, largely social in character—one of which was life insurance—was hardly known to our college and university mathematicians, and little study had been given by any of them to this unlimited field of useful and interesting material awaiting refined mathematical treatment.

It might fairly be said that students of the natural sciences recognized this situation before the mathematicians did. With mathematical equipment unequal to the task, they were trying as best they could to solve problems which they knew could be solved but with which they were unprepared to deal except by methods of elementary mathematical approach. It was this situation which first decided the writer to introduce in the University of Michigan courses in mathematics involving primarily the study of empirical probability.

One of the most important applications of this theory was actuarial mathematics. Early in the present century a

number of foreign universities had developed actuarial courses in their departments of mathematics. This was, of course, to a considerable extent, due to national insurance and pension plans already under way. Although the total insurance in force in the United States was more than that of all the rest of the companies in the world put together, no training of technical actuarial content was available in this country. It was, therefore, under most favorable conditions that such courses were started at the University of Michigan.

Personal conversations and conferences made it apparent that the life insurance companies were favorably disposed toward this new plan. Accordingly, in the fall of 1902, the first course in this field was offered in the University of Michigan. It appeared in the University *Calendar* for 1902-3 as Mathematics 45, "Theory of Annuities and Insurance (II), two hours, Dr. Glover." It was elected by eleven men and one woman, and was given on Tuesday and Thursday in Room 17, University Hall, North Wing (now known as Mason Hall). Oliver Winfred Perrin ('01, A.M. '04), Associate Actuary of the Penn Mutual Life Insurance Company, was a member of this class and the first graduate of the University to enter and remain in the actuarial profession.

These courses were first announced both in the Department of Mathematics and in the Department of Political Economy (see Part III: DEPARTMENT OF ECONOMICS). The faculty of the latter department was cordially disposed and was most helpful in the organization of the courses; it co-operated by encouraging election of these courses by students of political economy who had sufficient preparation in mathematics to undertake them with profit. The plan was to supplement the technical courses in actuarial mathematics by courses in

political economy which would develop more fully the social aspects of insurance.

It should be acknowledged here that from the beginning to the present time busy executives and officers of insurance companies throughout the country have given valuable and cordial support to this work and have frequently taken the trouble to come to Ann Arbor and lecture to our classes on various phases of their business. This interest from outside the University has stimulated the students and has undoubtedly contributed much to the success of the venture. The companies also have recognized the training received here by sending their officers year after year to select University of Michigan actuarial graduates for technical positions in various departments of the home offices. Many students from this department have advanced from modest actuarial positions to become secretaries, vice-presidents, presidents, and directors in the important life and casualty insurance companies of this country. University of Michigan students from China, Japan, Mexico, the Philippine Islands, and other countries are now holding responsible positions in such companies organized in their native lands. In a number of cases University of Michigan graduates in actuarial mathematics have organized successful companies which they now head.

Up to the present time about four hundred students have taken all the actuarial courses and most of them are now actively engaged in executive positions of high rank. Not a few of them hold official positions in government insurance offices in this and other countries. Among them are about fifty women graduates, of whom one-third have married and have retired from active business life.

Although the number of professional actuarial graduates is relatively small—about four hundred—the elementary

courses necessary to prepare students for advanced actuarial theory led to a new development for students not planning to become actuaries. They wanted an elementary course in financial mathematics, in which the mathematical content included simple and compound interest, annuities, sinking funds, valuation of securities, and depreciation. When such a course was offered, it attracted many students who were interested in the above subjects as a matter of general information and as a preparation for one of the many lines of modern business. This course injected into the classroom work a certain practical interest not ordinarily found in elementary mathematics courses. The result was a steadily increasing demand for Mathematics 51, (now Mathematics 47), for which in some years as many as three hundred students each semester were enrolled. And, since the elementary course in financial mathematics was begun at the University of Michigan in 1902, a similar course has been introduced into the mathematics department of almost every college and university in this country.

These courses at the University were organized and given at first by the writer, but additions to the teaching force were soon required because of the increasing number of students. Most of the work of instruction in actuarial science has been carried on of late by H. C. Carver, C. C. Craig, W. O. Menge, J. A. Nyswander, T. E. Raiford, and R. B. Robbins.

The curriculum in actuarial science has, in effect, developed a small professional field within the Department of Mathematics and a new group of elementary courses in finance, insurance, and statistics which have a strong appeal for many students who do not plan to enter the actuarial profession.

JAMES W. GLOVER*

* Died July 15, 1941.

III. COURSES IN MATHEMATICAL STATISTICS

The first work in mathematical statistics which was offered by this University was presented in a two-hour combined course, Mathematics of Insurance and Statistics, listed in the 1902-3 *Announcement* of the College of Literature, Science, and the Arts by the Department of Political Economy and Sociology. This course was initiated and taught by James W. Glover, and was listed among the mathematical courses with the note: "For a detailed description of the same, consult this *Announcement* under Political Economy and Sociology."

Although the description of this two-hour course indicated that an important place was given to statistical theory, subsequent *Announcements* reveal that the course was developed in the direction of insurance, rather than of statistics. Thus, in 1906-7 and the succeeding years the description was as follows: "This course includes an elementary treatment of the following subjects: Interest, investment securities, averages, mortality tables, annuities, computations of life insurance premiums, and reserves."

The first course that was devoted exclusively to statistical theory was offered in 1912 by Professor Glover, and this date should be regarded as marking the birth of our curriculum in statistics. The following year the course was taught by Edward Brind Escott ('95, M.S. Chicago '96) and in the next two years by Chester Hume Forsyth (Butler '06, Ph.D. Michigan '15). It was described (*Cal.*, 1912-13, p. 213) as follows: "The subjects treated in this course are averages, graphical representation of statistics, frequency curves, correlation, smoothing of statistics; with applications to statistical problems in economics, biology, insurance, and physics." It was given for two hours credit and was continued through the second

semester as Course 50. Elderton's *Frequency Curves and Correlation*, recommended by the Actuarial Society of America, was used as a text, and this work was supplemented by lectures on interpolation and mechanical quadrature.

During recent years research workers in nearly all fields have recognized the necessity of utilizing statistical methods in measuring the validity of results derived from observational data, and consequently a number of courses in statistical methodology are now being offered in an effort to serve the particular needs of the various departments and schools. The Department of Mathematics offers a special course in mathematics and statistics designed to meet the needs of students in the School of Forestry and Conservation, another course for students of sociology, the basic Courses 49 and 50 (now listed as Mathematics 43 and Mathematics 44), for which one year's work in freshman mathematics is a prerequisite, an intermediate course requiring a knowledge of calculus, and an advanced course designed for students working for higher degrees and specializing in the more theoretical aspects of probability and statistics. Until the end of June, 1940, nineteen students had received their doctor's degrees in mathematical statistics, the first doctorate in this field having been conferred in 1915.

The members of the mathematical-statistical staff are constantly being consulted on matters concerning statistical research from all corners of the campus. They also offer informal courses in statistics for staff members of the University who use statistical methods in their researches but who cannot afford the time required to master the mathematical background so necessary for a complete understanding of the statistical methodology which they employ.

The unusual success of this University in teaching and utilizing statistical meth-

ods has been achieved largely through the use of excellent mechanical equipment provided by the administration. Since a computing machine is available for each student in all recitation periods, it is possible for the student to work out numerical exercises simultaneously with the presentation of new topics. The University utilizes two complete Hollerith installations, one in the Rackham Building and the other in the University Hospital. The statistical laboratory possesses a very complete set of instruments such as adding machines, integrators, and harmonic analyzers.

In addition to the personnel of its mathematical-statistical staff, two other factors have contributed largely to the

leadership of the University of Michigan in statistical research. The Department of Mathematics is providing an essential mathematical background through courses in probability, finite differences, and other branches of pure mathematics which are of great value in developments of theoretical statistics. Also, the *Annals of Mathematical Statistics*—the only journal of its kind in the country and the official publication of the Institute of Mathematical Statistics, with a worldwide circulation—was founded within the University's Department of Mathematics in 1930 and was edited here until 1938, when its editorial office was transferred to Princeton University.

HARRY C. CARVER

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THE DEPARTMENT OF MINERALOGY

THE Department of Mineralogy was one of the earliest departments established at the University, and the first purchase authorized by the Board of Regents was an expenditure for a collection of minerals for this department. At a meeting of the Board held in November, 1837, Dr. John Torrey, of New York City, was asked to examine and report on a collection of 2,600 specimens, largely from European localities, which was offered for sale by Baron L. Lederer, and the Regents, upon receiving a favorable report at their

January meeting, 1838, concluded the purchase of this collection for \$4,000. When it is recalled that the University did not open its doors to students until the fall of 1841, the foresight of the first Board indicated by this early purchase is evident. This valuable cabinet of minerals became the nucleus of our present museum collections, which in subsequent years have been augmented frequently by additional purchases, or through gifts and exchange of specimens.

At the October meeting of the Regents in 1839, the first appointment was made

to the teaching staff of the Department of Mineralogy. Douglass Houghton (A.M. and M.D. Rensselaer Polytechnic Inst. '29) was tendered the position of Professor of Geology and Mineralogy, and also was "charged with the subjects of Chemistry and Pharmacy till the Regents take further order in relation thereto" (*R.P.*, 1837-64, p. 100). Because of his training and experience the selection of Houghton was very fitting. After his college training he had accompanied Schoolcraft on an expedition to the copper-mining region of Lake Superior. He had written a "Report on the Existence of Deposits of Copper in the Geological Basin of Lake Superior," which had attracted so much attention that in 1837 he was appointed state geologist.

His appointment as Professor carried with it a salary of \$1,500 a year, but it was stipulated that the salary was not to begin until he entered upon his duties as a teacher, and as circumstances prevented him from assuming regular duties in Ann Arbor, he never received any salary from the University. It is reported, however, that he did give a brief course of lectures (Farrand, p. 55), and some confirmation of this statement may be found in the faculty report for 1842 (*Sen. Doc.*, 1843, No. 5, app., p. 84). Although in the first *Catalogues*, 1843-44 and 1844-45, mineralogy was scheduled for the third term of the junior year and Houghton was listed as Professor of Chemistry, Mineralogy, and Geology, there is a lack of evidence in reports of work completed that the mineralogy course was actually given.

While engaged on a geological survey of the Upper Peninsula, Houghton lost his life in a storm on Lake Superior, October 13, 1845. Although his association with the University was all too brief, his influence was enduring, as his collections of mineralogical and geo-

logical specimens came into possession of the University through an act of the legislature passed in 1846.

Silas Hamilton Douglass (A.M. hon. Vermont '47), who had formerly accompanied Houghton on his geological surveys of Michigan and had served for one year as his assistant, especially in chemistry, was placed in charge of the department after Houghton's death in 1845. He was a man of unusual ability, and during his thirty-three years with the University he was called upon to serve in many and varied capacities, as indicated by the titles he held at different times. After serving as a lecturer on chemistry and geology in 1845-46 he held the following professorships: chemistry and geology, 1846-47; chemistry, mineralogy, and geology, 1847-50; chemistry, pharmacy, medical jurisprudence, geology, and mineralogy, 1850-55; chemistry, mineralogy, pharmacy, and toxicology, 1855-70; chemistry and mineralogy,¹ 1870-74; chemistry, 1874-75; and metallurgy and chemical technology, 1875-77. Also, he was Director of the Chemical Laboratory, 1870-77.

Thus it appears that the first actual systematic instruction given in mineralogy dates back to 1845, when Silas Douglass was placed in charge of the department. In 1874, largely because of the increasing demands upon his time as the result of the rapid expansion in the field of chemistry, the Regents, at their October meeting, relieved him of some of his responsibilities by voting to drop the word "mineralogy" from his title.¹

Douglass was followed by Eugene Woldemar Hilgard (Ph.D. Heidelberg '53, LL.D. Michigan '87), who had studied at the Royal Mining School at Freiberg and also at Zurich and Heidelberg. When

¹ In the *Calendar*, as well as in Hinsdale's *History*, the chair held by Douglass during this period is given as that of chemistry only, though the Regents included the word "mineralogy" in his title in 1870 and specifically dropped it in 1874.

the invitation was extended to him he was Professor of Chemistry at the University of Mississippi and state geologist. In 1873 he came to Michigan as Professor of Geology, Zoology, and Botany, but the following year his title was changed to include mineralogy. His tenure was very brief, however, for he submitted his resignation, effective in March, 1875, in order to accept the professorship of agricultural chemistry at the University of California and to be the director of the State Agricultural Experiment Station.

Hilgard received many honorary degrees. In 1903 the University of Heidelberg, reconfering a degree after an interval of fifty years—a very unusual procedure—gave him the honorary diploma of doctor of philosophy.

Certain developments between 1865 and 1875 in a field closely related to that of mineralogy largely determined the choice of the next man who was called to carry on the work. With the early recognition of the importance of the copper and iron deposits in the state, it was but natural that sooner or later agitation for the establishment of a School of Mines at the University would develop. This discussion apparently originated within the faculty of the Department of Literature, Science, and the Arts. In March, 1865, the president reported that the faculty had considered the propriety of establishing a School of Mines and desired authority to do so. This authorization was granted by a resolution passed on March 28, 1865:

Resolved, That the President and Academic Faculty be requested to prepare an article for insertion in the Annual Catalogue on the subject of a School of Mines, so far as now developed in the University; and that the degree of Mining Engineer be conferred on those who complete the course of study prescribed in the same. (*R.P.*, 1864-70, p. 78.)

Thus the University undertook, in a small way and without special appoint-

ments or legislative appropriation, to give instruction in this new field. Two degrees of mining engineer were conferred in 1867, six in 1868, and seven in 1869.

It must have become apparent shortly that the limited number of courses given was wholly inadequate in preparation for such a profession, and that in justice to the many people in the state interested in the mining industry, a more comprehensive program of study and greater laboratory facilities should be offered. In 1875 the Regents were authorized to establish a School of Mines (including a Department of Architecture), and the legislature made appropriations of \$8,000 for salaries and of \$2,500 for apparatus for each of the two college years 1875-76 and 1876-77. Three professorships were provided—in mining engineering, in metallurgy, and in architecture and design—and provision was also made for employing assistants if they should be needed. Accordingly, Douglas² was transferred to the professorship of metallurgy and chemical technology, and William Henry Pettee (Harvard '61) became Professor of Mining Engineering in 1875. At the time of his appointment Pettee had spent three years at the mining school at Freiberg, Saxony, and eleven years teaching at Harvard University, where he was Assistant Professor of Mining Engineering.

As noted above, the appropriations for the School of Mines were made for a two-year period, but the legislature of 1877 failed to provide for its continued support. Hopeful that the legislature might reconsider its action at the following session, the professors of mining engineering and metallurgy "struggled on for two years without pay . . ." (Farrand, p. 223). No financial support was in sight, and the School of Mines at the University was therefore definitely aban-

² He used this spelling after 1873.

done. No precise reason can be assigned to the action of the legislature in changing its attitude within the short period of two years, unless it was the small enrollment in this field of engineering or a growing feeling among some of the members of the legislature that the School of Mines should be situated in the Upper Peninsula.

In June, 1877, upon the abandonment of the School of Mines, Pettee submitted his resignation as Professor of Mining Engineering, but was immediately given the appointment of Professor of Geology in charge of Mining Engineering, effective the next October. He became Professor of Mineralogy and Economic Geology two years later and Professor of Mineralogy, Economic Geology, and Mining Engineering in 1881. He continued to give the instruction in mineralogy until the time of his death in 1904, although during the latter part of his regime he was burdened with an excessive amount of editorial work, especially in connection with the printing of the annual *University Calendar* (see Part II: OFFICE OF THE REGISTRAR). This naturally interfered with his teaching to such an extent that only a few courses were offered.

Edward Henry Kraus (Syracuse '96, LL.D. *ibid.* '34, Ph.D. Munich '01) became Assistant Professor of Mineralogy in 1904, succeeding Professor Pettee. Four years later his title read Professor of Mineralogy and Petrography and Director of the Mineralogical Laboratory. The growth of the department under Kraus's leadership was remarkably rapid, largely because of his energy, enthusiasm, and foresight. The number of courses offered was increased, and the enrollment mounted. The Regents, clearly aware of the needs of an expanding department, graciously voted liberal appropriations which made it possible to enlarge the departmental personnel and to provide the necessary apparatus and equipment.

The teaching staff was gradually increased, until at the present time it consists of five members of professorial rank and a number of assistants. Fortunately, during this period of very rapid expansion new quarters for the department were provided in the Natural Science Building.

In addition to being a stimulating teacher, Professor Kraus possesses rare executive and administrative abilities. He has therefore been called upon frequently to serve the University in various additional capacities. From 1911 to 1915 he served as Acting Dean of the Summer Session and from 1915 to 1933 as Dean; in the School (later, College) of Pharmacy, he was Acting Dean from 1920 to 1923, and Dean from 1923 until 1933.

After the death of Dean Effinger in 1933, Professor Kraus was appointed Dean of the College of Literature, Science, and the Arts (see Part III: ADMINISTRATION AND CURRICULUMS). Because of his many duties as head of the largest administrative unit of the University, he has been relieved of all formal teaching, although he is still a member of the staff, and in 1933 the affairs of the department were placed in the hands of Walter Fred Hunt ('04, Ph.D. '15) as Chairman.

In 1939-40 the personnel of the Department of Mineralogy was as follows: Edward Henry Kraus, Professor of Crystallography and Mineralogy and Dean of the College of Literature, Science, and the Arts; Walter Fred Hunt, Professor of Petrology and Chairman of the Department of Mineralogy; Albert Becker Peck (Syracuse '14, Ph.D. Michigan '25), Associate Professor of Mineralogy; Lewis Stephen Ramsdell ('17, Ph.D. '25), Associate Professor of Mineralogy; Chester Baker Slawson ('19, Ph.D. '25), Associate Professor of Mineralogy; Marion V. Denny ('32, M.S. '33), Assistant Curator; Robert A. Hatch ('37, M.S. '38),

teaching fellow; and William B. Colburn, Honorary Associate Curator.

PROGRAM OF STUDIES.—The subject of mineralogy might appear to cover a very restricted field of natural science, limited to students desirous of becoming professional mineralogists and geologists. To these groups its appeal is especially direct, but also, as a service science, mineralogy is valuable to students in many related fields. Certain optical methods perfected by the mineralogist find application in other branches of science and in industry, so that present elections in mineralogy include students enrolled in six schools and colleges—the College of Literature, Science, and the Arts, the Graduate School, and the Colleges of Pharmacy, Forestry, Architecture, and Engineering.

One of the methods commonly employed in the purification of both organic and inorganic compounds is that termed recrystallization, in which bodies bounded more or less completely by natural plane surfaces, called crystals, are formed. A knowledge of crystallography and of the methods employed for determining the optical properties of crystals—especially the recognition of crystal forms and the use of the petrographic microscope for obtaining the required optical data—is essential for the pharmacy student.

Students in forestry are concerned with the various types of soils. For a full understanding of the transformation from a solid rock mass to a residual soil, some knowledge of the chemical and physical properties of the original minerals is absolutely necessary. It is also highly desirable for the student of forestry to recognize the more common minerals and rocks and the important ores.

Not only do the various stones used in construction possess varying degrees of resistance to climatic changes and to the corroding influence of our acid atmos-

phere, but one and the same stone may show considerable variation in "life," depending upon its location and the construction methods employed. There are numerous instances, both in this country and Europe, in which the architect or the engineer has selected the wrong type of material. In many universities and colleges, therefore, students of architecture and engineering are required to elect courses in mineralogy.

In recent years also the use of X rays has been extended to include their application in the testing of materials, especially steel castings and nonferrous alloys. Here again, a proper interpretation of the behavior of matter when placed in the path of these penetrating rays requires a knowledge of one phase of crystallography. Indirectly, a knowledge of mineralogy also serves the chemist and ceramist, and, if the experience of the past is any indication of the trend in the future, it is not at all unlikely that further diversification of courses in mineralogy will be needed for students in special fields.

PRESENT QUARTERS AND FACILITIES.—With the completion of the Natural Science Building in 1915, the Department of Mineralogy moved into its present location from the dingy, cramped, and wholly inadequate quarters in the basement of Tappan Hall. The Natural Science Building was constructed to house the Departments of Botany, Forestry, Geology, Mineralogy, Psychology, and Zoology. In order that this building might contain the best facilities for instruction in these fields, representatives from the departments concerned visited other leading institutions with Mr. Albert Kahn, the architect, in order to study the methods and equipment that had been adopted elsewhere. Many of the valuable suggestions thus obtained were incorporated in the final plans of the building. One of the advantages most

desired was the maximum amount of floor space and light, and it is the universal consent of those who have visited the building that these objectives have been achieved.

Each of the six departments was assigned a vertical section from the basement to the roof. This arrangement permitted the Department of Mineralogy to install heavy machinery and piers for the mounting of special apparatus on the ground floor and also provided excellent facilities for storage and for the shipping and receiving of material. The other floors are utilized for laboratories, lecture rooms, offices, and a large display room for mineral collections.

The Department of Mineralogy occupies the northeast part of the building and comprises thirty-five rooms. This northern exposure is especially desirable for microscopic work because of the uniform and diffused light in both winter and summer. On the first or ground floor there are three research rooms provided with nonvibration piers and equipped with water, gas, compressed air, and alternating and direct current; two offices for those engaged in research conducted on this floor; a laboratory for the preparation of both thin and polished sections; and storage rooms.

On the second floor are the general lecture room, with a seating capacity of one hundred students; model rooms, containing material for demonstration purposes; an office; and a large room, twenty-four by seventy-two feet, devoted to the exhibition of gems, minerals, and rocks. This room is open to the public daily. The corridors on the second floor have been lined with glass cases containing special and unusual exhibits.

The main laboratories for general mineralogy and for the more advanced work in mineral and rock analysis are on the third floor. Also on this floor are two offices, a balance room, and a well-

supplied stockroom to furnish all the necessary materials and equipment for the accurate and complete determination of minerals by both physical and chemical means.

On the top, or fourth, floor, ample facilities are afforded for the optical study of minerals and for instruction in crystal measurements. Likewise, the work involving the critical study of rocks, by megascopic methods and by the use of the petrographic microscope, is carried on to advantage on the top floor, as the northern unobstructed exposure furnishes ideal light conditions for such studies. Also, a rather complete library of reprints of articles on mineralogy assembled by the staff has been installed and has been well indexed for reference use by advanced students.

The department is well equipped with crystal models, structure models, natural crystals, and working collections of minerals, rocks, and thin sections. Crystallographic and optical apparatus of the most modern types renders it possible to carry on teaching and research in every phase of crystallography, mineralogy, and petrography.

PUBLICATIONS.—Among the publications from the mineralogical laboratory between 1903 and 1937 are six textbooks and 108 scientific papers. The textbooks cover the general fields of crystallography, descriptive mineralogy, determinative tables, general mineralogy, and gem materials:

Essentials of Crystallography (1906), Edward H. Kraus

Descriptive Mineralogy (1911), Edward H. Kraus
Mineralogy—an Introduction to the Study of Minerals and Crystals (3d ed.; 1936), Edward H. Kraus, Walter F. Hunt, and Lewis S. Ramsdell
Tables for the Determination of Minerals (2d ed.; 1930), Edward H. Kraus and Walter F. Hunt
Gems and Gem Materials (2d ed.; 1931), Edward H. Kraus and E. F. Holden

Petrographic Methods (translation from the German of Weinschenk's book; 1912), Robert W. Clark

The scientific papers likewise cover a wide range of contributions relating to (a) occurrence and origin of minerals, (b) crystallographic forms observed on crystals, (c) X-ray investigations of crystal structures, (d) variations in

microstructure and optical properties of minerals at high temperatures, (e) petrographic studies of rocks and minerals, and (f) new apparatus to determine specific properties of minerals and rocks.

WALTER F. HUNT

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THE DEPARTMENT OF ORIENTAL LANGUAGES AND LITERATURES

THE University of Michigan very early sensed the importance of Oriental studies. In the meeting of the Board of Regents of June, 1864, the committee on classical courses and the president were requested to report "whether in their opinion it is not expedient to appoint a professor of the German and Hebrew languages," and on March 31, 1869, the Regents asked the committee on classical courses to consider and report upon the propriety of providing for instruction in Hebrew or the Oriental languages.

The "propriety" was not denied, but "provisions for instruction" in the broad, and, at the time, somewhat indefinite, field of Oriental languages required extended consideration. It is not surprising, therefore, that it was not until twenty years later that the provision for instruction finally materialized. During that interval Sanskrit was still the ro-

mantic and remote Oriental study that lay beyond Greek and Latin.¹ Hebrew was studied by theologians, who sometimes dipped into Biblical Aramaic and Syriac also, but for purely exegetical reasons. Arabic was losing its place as the key to Semitic languages and was not yet of sufficient interest in itself to overcome its reputation for difficulty. Ethiopic and the remoter Semitic languages were below the horizon. Egyptian and Coptic—not really Semitic languages—became the concern of another group of scholars. Assyrian appeared as the Sanskrit of Semitic studies and as the key to most important records relating to the

¹ Sanskrit, in connection with classical or Germanic philology, was offered by Calvin Thomas (1879-87), Walter Miller (1887-89), Edwin Fay (1890-91), H. F. de Cou (1892-93, 1894-95), W. H. Wait (1895-1901), C. L. Meader (1902-26), and C. G. Kulkarni (1926-31), and after 1881 was indicated at times in the titles of all these men except Miller and Fay. Sanskrit was also taught by Professors Belser and Craig (see pp. 664-65).

Bible. William Rainey Harper attempted to popularize Hebrew studies among the laity by organizing the nation-wide American Institute of Hebrew. Latin and Greek were required for the bachelor of arts degree in the University of Michigan. A great deal of effort went into documentary (the so-called "higher") criticism of the text of the Old Testament. A sufficient number of theological students flowed through the colleges into the seminaries. Faculty members taught many hours, and often in several unrelated subjects, with little time for research and publication, yet, nevertheless, found time for Bible classes. Under such circumstances Carl William Belser ('82, Ph.D. Leipzig '89) in a sense became the founder of the Department of Oriental Languages and Literatures, although at that time, when several of the larger academic units—in medicine, law, and literature, science, and the arts—were known as departments, the subordinate departments for the separate subjects or subject-groups were rarely spoken of as such.

Belser was the son of a clergyman of Ann Arbor, a graduate of the Ann Arbor High School and of the University. After obtaining his bachelor's and master's degrees in Ann Arbor he taught Latin in Mount Morris College and Carthage College, in Illinois. From 1887 to 1889 he studied with the great ones in Leipzig, and received his doctor's degree under Friedrich Delitzsch. He was called in 1889 as Instructor in German and French. The next year he was Instructor in German and Hebrew, and the third, Assistant Professor of Oriental Languages. In his second year he taught twenty hours of German, twelve of Hebrew, and four of Assyrian; in his third year, ten hours of Sanskrit, four hours of Hellenistic Greek, nine hours of Hebrew, and four hours of Assyrian. That, at least, is what he offered to do (*Cal.*, 1889-92). That his

classes were well attended we may well doubt, but we may be sure that they were attended by none but students who were willing to study languages, for he imparted his great learning entirely through his interpretation of texts, in the manner of German orientalists. Reliable reports indicate that some of these students were lacking in both ability and proper scientific interest. He gave no lecture courses. The awkward term "Semitics" does not occur in connection with his title or his work. As Assistant Professor of Oriental Languages he had to give Sanskrit, and as a Biblical scholar he had to give Hellenistic Greek—at that time pretty much confined to the New Testament, for the study of the Greek of the Graeco-Roman period as brought to light by the papyri of Egypt had hardly begun, though Belser was well aware of its potentialities.

His fourth year, and unfortunately his last in the University, found him released from Sanskrit and giving an ambitious program, purely linguistic and, with the exception of Hellenistic Greek, purely semitic. He offered fourteen hours of Hebrew, four of Assyrian, four of Arabic, and one hour each in Semitic palaeography and epigraphy, besides his nine hours of Greek. At the end of the first semester his failing health compelled him to remove to a better climate, and he went to the University of Colorado as head of its department of Latin. He died on January 28, 1898, of tuberculosis. Among the well-known pupils of this truly remarkable man may be mentioned the Librarian Emeritus of the University, William W. Bishop, and the late senior Professor of Astronomy, Heber D. Curtis.

For the second semester only, Belser was succeeded by a distinguished Assyriologist as Acting Assistant Professor of Oriental Languages, Professor Wilhelm Muss-Arnolt (B.D. Divinity School

[New Brunswick, N.J.] '83, Ph.D. Johns Hopkins '88), a German of prodigious bibliographic knowledge and great lexicographical profundity, author of the *Concise Dictionary of the Assyrian Language* (1905). That he was called at all indicates the serious scientific purpose and spirit of the administration and the times. That he did not please, or was not pleased, must be laid to personal considerations.

James Alexander Craig (McGill '80, Ph.D. Leipzig '86) came to the University in the fall of 1893 with the title of Professor of Oriental Languages. Craig also was a pupil of Delitzsch and an Assyriologist. He differed from Belser in being more concerned with the "higher criticism," and more enamoured of the inductive method, as expressed in the Hebrew textbooks of William Rainey Harper. He appears to have come from an atmosphere of controversy. The *Calendar* of that year contains the new caption Semitic Languages, prominent mention of the inductive method, and an appeal to the interest of theological students. The inductive method, in the opinion of some who learned Hebrew under him, was a method less profitable to the student than it was interesting to the instructor. However, it must be recorded with gratitude that he was an inspiring teacher who, with George Hempl (see Part III: DEPARTMENT OF ENGLISH LANGUAGE AND LITERATURE), gave some students their first glimpse of German scholarship. He taught at a time when this scholarship was beginning to be secretly opposed, rather than sharply challenged; at a time when the classics were declining and when students were beginning to show the effect of the decline in their preparation and in their tastes.

Craig offered a small selection of courses at first: Hebrew and Assyrian. Hellenistic Greek he gave as a theologian

and as Belser's successor; Sanskrit also, as Professor of Oriental Languages, although Belser had got rid of this. Significant is the introduction of a lecture course requiring no knowledge of Semitic or other languages, a one-hour course of general introduction to the study of Semitic peoples. In 1894 his title was changed to Professor of Semitic Languages and Literatures and Hellenistic Greek. The courses in Hellenistic Greek were transferred from the list of other Greek courses and placed among the courses in Semitic languages. He dropped the Sanskrit. The effect of these two changes was to make him appear more of a Biblical and Semitic scholar. Nevertheless, the heading Semitic Languages disappeared from the *Calendar*, and also the general lecture course. His continued interest in languages is shown by the addition of Arabic to the program (1894-95), the increase of Arabic (1896-97), and the introduction of Aramaic, Syriac, and Ethiopic (1900-1901). Arabic and Aramaic were undoubtedly given, the other two almost certainly not. Again (1897-98) a lecture course with no language requirements, Semitic History, appeared. These two-hour, nontechnical courses were increased to four in 1901-2, to eight in 1904-5, to nine in 1905-6, and in 1909-10 to thirteen, nine of which were to be given personally by Professor Craig.

In 1908-9 Craig was on sabbatical leave, and most of his courses were marked as omitted. Some Hebrew and Greek and four of the lecture courses were carried by William Hoyt Worrell ('03, B.D. Hartford '06, Ph.D. Strassburg '09), the Reverend Carl Safford Patton (Oberlin '88, D.D. *ibid.* '03, Ph.D. Michigan '13), pastor of the Congregational Church, and the Reverend James Leslie French ('99, B.D. Hartford '02, Ph.D. *ibid.* '05), student pastor of the Presbyterian Church. Upon Craig's re-

turn a new heading appeared—Semitics and Hellenistic Greek and Studies in the English Bible. This is the first appearance of the term Semitics, a pompous and pretentious title, patterned no doubt on physics, but reminding the students of nothing but "athletics," for it was invariably spelled and pronounced "Semetics." Craig was assisted this year by Worrell and French. The following year Craig was alone in the department, and the descriptive matter in course announcements noticeably increased. In the fall of 1912 Craig left the University, for entirely personal and nonacademic reasons, first engaging in business in Canada, but later returning to the teaching of Oriental languages at McGill University and the University of Toronto. The latter part of his life he spent in Paris. He died in Toronto, May 16, 1932. Most of Craig's courses in 1912 were without a teacher, but Dr. French, as Acting Assistant Professor, taught Hebrew and Greek and remained two years with varying titles. Gilbert Hawthorne Taylor (DePauw '09, Ph.D. Michigan '14) was Instructor in Semitics in 1914-15.

Leroy Waterman (Hillsdale '98, B.D. Hillsdale Divinity School '00, Ph.D. Chicago '12) took charge of the department in 1915-16 and remains its Chairman. His title appeared as Professor of Semitics. Hellenistic Greek disappeared from the announcement of the department, being returned to the list of courses offered by the Department of Greek. Under his administration graduate work, with technical requirements, in Assyrian and Hebrew has been carried on and developed. Also the program of nonlinguistic instruction—in history, Oriental civilization, and the Bible and comparative religion—dictated by the age and time in which we live, has been much enlarged and intensified.

In 1925 Worrell returned to the Department of Semitics and assumed the

Arabic and Coptic studies, which were stimulated by the papyrus purchases and finds of the late Professor Francis W. Kelsey.

In 1927-28 Waterman was granted a leave of absence to serve as annual professor of the American School of Oriental Research at Baghdad, Iraq. The incumbency involved research rather than teaching, and the year was spent in the Near East, first in the study of and participation in archaeological field work in Egypt, Palestine, and Iraq, and secondly in independent topographical study of the region of the Nahr Malcha (Royal Canal) between the Tigris and Euphrates, at their nearest approach to each other. This investigation resulted in the identification of the site of the city of Seleucia on the Tigris, and led to two months of preliminary excavation and soundings made on the site under the auspices of the Baghdad School, supported by funds contributed by the Museum of Art of Toledo, Ohio. The results gave welcome confirmatory evidence of the city of Seleucia and its late Parthian occupation. (For more complete information regarding the papyri and the University archaeological excavations, see Part VIII: ART AND ARCHAEOLOGICAL COLLECTIONS.)

The work of the department during the academic year 1927-28 was greatly stimulated and enhanced by the addition to the staff of Caroline Louise Ransom Williams (Mt. Holyoke '96, Ph.D. Chicago '05) as resident lecturer on Egyptian. The courses offered in Egyptian hieroglyphics (Old Egyptian) and in Egyptian art and archaeology met with an enthusiastic response. As a result of the preliminary work done at Seleucia a joint archaeological expedition with a planned five-year program was organized by the University, acting jointly with the Toledo Museum of Art. The Toledo Museum supplied the funds and

the University took the responsibility for the field work and the publication of results. Under this arrangement the University granted Waterman leave of absence for the first semester each year from 1928 to 1932 to direct the work of the expedition at Seleucia. During the four semesters of his absences, his regular courses were very acceptably conducted by Miss Ellen Whitley Moore ('12, Ph.D. '32), a former student of the department who obtained the doctor of philosophy degree in Oriental languages and literatures in 1932.

The department discarded from its name the term Semitics in 1930 and since has been known as the Department of Oriental Languages and Literatures, in consonance with Professor Belser's title and the original purpose of the undertaking. In conjunction with the Linguistic Institute the department in the summer of 1936 offered Hittite, Chinese, and Japanese, and in the summer of 1937 Sumerian was added and Chinese and Japanese were continued and further extended.

Special research activities by members of the department have resulted in the publication of thirteen volumes.

The University collections of original documents belonging within the province of the Department of Oriental Languages and Literatures consist of the following:

1. *Babylonian*. Embracing (a) over five hundred cuneiform tablets ranging from Old Akkadian to Neo-Babylonian. A volume of Neo-Babylonian texts by Dr. E. W. Moore was published in 1939; (b) over fifty seal cylinders, button seals, and seal stamps from Jemdet Nasr, Sumerian, Akkadian, Neo-Babylonian, and Persian times.

2. *Aramaic*. A group of three complete incantation bowls and fragments from the excavations at Seleucia.

3. *Coptic*. Manuscripts, papyri, and ostraca, obtained chiefly through the efforts

of Professor Kelsey and the University of Michigan expedition in Egypt. These consist of fifty-four manuscripts, of which twenty are Biblical, thirty-two are ecclesiastical, and one is magical. Forty-six leaves are from the White Monastery, and are related to the Morgan collection. Some thirty-three of the papyri are Biblical, thirty-two are ecclesiastical, and thirty are magical. There are 112 epistolary or documentary papyri, and 181 of some other sort or unidentified. Of special interest are three early letters in Sahidic, a very old Boheiric letter, a husbandman's calendar, an Old Coptic horoscope(?) of the second century, and twenty-two items of Fayumic (of which fourteen are Biblical, six are documentary, and one is ecclesiastical). Some of the ostraca belong to the "etmoulon" group.

4. *Arabic and Islamic*. Three collections of Islamic manuscripts were acquired by Professor Kelsey. The so-called Abd ul-Hamid collection has artistic and calligraphic value. The Tiflis collection is mostly juridical. The Yahuda collection contains some nine interesting items. Some 438 of these are Arabic, though many are Persian and Turkish. In Arabic papyri we possess about thirty-four documents, in fine condition and of great interest.

5. *Ethiopic*. In Ethiopic we have eight manuscripts, Biblical and magical.

The University Library possesses a nearly complete set of photographs of the Coptic manuscripts in the Morgan collection.

In addition to original documents the department possesses a large number of casts of original monuments in the British Museum and the Louvre, from Mesopotamia. These include bas-reliefs of lion hunting and of military operations, a pastoral scene from the palace of Ashurbanipal of Assyria, two boundary stones from the Kassite period, the black obelisk of Shalmaneser, and the East India house inscription of Nebuchadnezzar II.

WILLIAM H. WORRELL
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THE DEPARTMENT OF PHILOSOPHY

IN the project for the formation of the Catholepistemiad, 1817, out of which developed the effective plan for the University of Michigan, 1837, provision was made for *didaxiim*, or professorships, of *ethica*, or ethical sciences, and *ennoeica*, or intellectual sciences, the latter embracing "all the *Epistemiim*, or Sciences relative to the minds of animals, to the human mind, to spiritual existences or to the Deity, and to religion." It was provided, further, that the vice-president of the Catholepistemiad should be the professor of *ennoeica*. Two men were appointed respectively president and vice-president, the Reverend John Monteith, a Presbyterian, and Father Gabriel Richard, a man of foreign birth and education. To Father Richard was assigned the professorship of *ethica* and the *ennoeica*. Thus the professorship of moral and intellectual sciences, as the chair came to be called, uniting the two disciplines, was first occupied by a Roman Catholic. It is not known, however, whether Father Richard conducted any courses, but it is known that he and the Reverend John Monteith drew, together, a salary of \$181.25. The founding of this chair was the beginning of the Department of Philosophy. In the so-called "organic act" of March 18, 1837, setting up

the constitution of the University of Michigan, provision was explicitly made for professorships of logic, of philosophy of the human mind, of moral philosophy, and of natural theology, including the history of all religions. In the subsequent early history of the University, all these subjects were usually taught by the professor of intellectual and moral philosophy (who, sometimes, also taught other branches of knowledge), with the exception of logic, which was now and then combined with rhetoric rather than with philosophy.

When we look back over the period of nearly one hundred years beginning with the time of the Reverend Edward Thomson, 1843—the first, so far as we can discover, actually to give instruction in moral and intellectual philosophy—we see that the history of the Department of Philosophy may be divided into two periods—a period which I think may appropriately be called the theological period, and the period of free philosophy which began with Morris, in 1881. In the first period all the professors of intellectual and moral philosophy, without exception, were clergymen, whereas in the second period none has been; in the first period, the occupants of the chair were, therefore, with the possible exception of

Tappan, as we shall note, not trained primarily for their position; it is therefore not unfair to say of them that they were at best amateurs in the field, and that their chief preoccupation was to make use of philosophy as a means for the defense of a point of view already received from the tradition of theology, rather than to transmit and perhaps enrich the tradition of philosophy itself.

Except that it would be unfair to the greatness and subtlety of thought of the medieval philosophers, one might say of these early teachers of philosophy that they represented a kind of Protestant scholasticism, for philosophy was indeed *ancilla theologiae*. It was not the close contact with religion that distinguished the philosophy of these men—for philosophy has maintained this contact almost throughout its entire history, and a philosophy that does not offer something either to science or to religion is not worth its salt—but the fact that, having independently of the study of philosophy accepted certain theological ideas, these men never did what genuine philosophers must do—freely and candidly examine the presuppositions or set pieces of the game of thought and belief. A Morris or a Wenley was as religious as any of these men, but for them philosophy was not a defense but a clarification. Moreover, such philosophy as these early teachers had was gleaned mostly from the Scottish school—a distinctively eighteenth-century way of thinking—and they knew only at second hand, if at all, the great, original movement of philosophy of their own century—that of German idealism.

Yet in all these respects, early academic philosophy at the University of Michigan was no different from academic philosophy throughout the country. In fact, the change to a more genuine and freer type came earlier here than at the great universities of the East. With all their limitations, these early philoso-

phy teachers undoubtedly served the needs of their time, and anything different would have been impossible.

Something at once of the importance attached to the study of philosophy and its general character in this early period may be seen from its place in the course of study, as announced in the *Catalogue* of 1843-44. The course of study was divided into three parts: (1) language and literature, (2) mathematics and physics, and (3) intellectual and moral science. Apparently no philosophy was required in the first year. In the first term of the second year, logic was prescribed; in the third year, first term, Abercrombie's *Intellectual Powers*, and in the second term of that year, Paley's *Natural Theology*; in the fourth year, first term, Stewart's *Intellectual Philosophy* and Cousin's *Psychology*; in the second term, Whately's *Logic* and Wayland's *Moral Science* and *Political Grammar*; in the third term, along with Story's *Commentaries on the Constitution* and Wayland's *Political Economy*, Butler's *Analogy*.

After the reform of the curriculum under President Henry P. Tappan (see Part I: TAPPAN ADMINISTRATION), Mental Philosophy was prescribed in the third term of the third year, and again in the first and second terms of the fourth year, and Moral Science in the second and third terms of the fourth year. In the classical course Mental Philosophy was prescribed in the fourth year, first and second terms; Logic in the second term, and Moral Science in the second and third terms of that year. In the so-called university course, which marked the beginning of a graduate school, designed for students who had won their bachelor's degrees either in letters or science, provision was made for Systematic Philosophy, History of Philosophy, Logic, and Evidences of Christianity. A brief description of the method employed in teaching Intellectual and Moral Philoso-

phy was given in the *Catalogue* of 1854-55 and in ensuing numbers, as follows:

This study is conducted by the use of text-books, accompanied with lectures. Essays on subjects connected with the course are read by students and criticized by the professor. One is read at each recitation. Reference is made to the standard works of ancient and modern philosophy.

The first professor of moral and intellectual philosophy, as has already been noted, was the Reverend Edward Thomson (M.D. Pennsylvania '29, LL.D. Wesleyan '55), afterward president of Ohio Wesleyan University and a bishop of the Methodist Episcopal church. He was appointed in 1843, but resigned in August, 1844. This left the way open for the Reverend Andrew Ten Brook (Madison [Utica, N.Y.] '41), subsequently both librarian and historian of the University, who served until 1851. Ten Brook was followed by the Reverend William Stanton Curtis, who served for only a year and was followed, upon the accession of Tappan to the presidency, by Tappan himself, in 1852.

Of all the men of the early period of the teaching of philosophy at the University of Michigan, Henry Philip Tappan (Union '25, D.D. *ibid.* '45, LL.D. Columbia '54) was undoubtedly both the best trained and the ablest. Although originally trained for the ministry, he spent many years before he came to Michigan in the study and teaching of philosophy, as professor of intellectual and moral philosophy at the young University of the City of New York, where he had become a professor in 1832. Before coming to Ann Arbor he had already made a name for himself both in this country and abroad through his publications: *The Doctrine of the Will, Determined by an Appeal to Consciousness* (1840), *The Doctrine of the Will Applied to the Moral Agency and Responsibility* (1841), and his *Elements of Logic* (1844;

new ed., 1856). Although the two books on the will were in general within the limits of the ideas characteristic of the so-called freewill controversy initiated by Jonathan Edwards' great work, Tappan took the freewill point of view, and in the *Doctrine of the Will Determined by an Appeal to Consciousness* showed a certain originality in generalizing the notion of contingency from the will to the entire universe, and by developing a conception of "moral certainty" or "probable certainty" as applied to human affairs, to replace the absolute certainty rendered impossible by the doctrine of real contingency. Indeed, it is not extravagant to claim for Tappan that in making contingency consist essentially in the power to attend or not to attend, he anticipated, if he did not inspire, William James's famous formulation of freedom (compare Tappan, *Doctrine*, p. 65, and James, *Psychology*, II: 562). In his *Elements of Logic*, moreover, while following Cousin and Herschel, he showed some novelty in developing the theory of inductive methods, independently of Mill and Whewell. However, it is significant that, although he was acquainted with contemporary European philosophy, Tappan seems to have depended largely upon the translations of French and German works that were appearing in his day.

After the resignation of President Tappan and until the early period ended with Morris' acceptance of a chair in philosophy in 1881, the teaching of philosophy was on a distinctly lower plane. First, the Reverend Lucius Delison Chapin (Amherst '51, A.M. *ibid.* '54), pastor of the local Presbyterian Church, was appointed. Chapin's qualifications for this office are not easily discoverable. The utter lack of recognition on the part of University authorities, during this period in America, of philosophy as a branch of learning requiring a specific training, is well illustrated by this appointment. One

would demand special training for astronomy or mathematics, but almost any clerical gentleman would serve for philosophy! (Unfortunately, the practice continues among certain of the smaller denominational colleges of America to this day.) While Chapin was on leave in 1867-68 his work was borne by Erastus Otis Haven (Wesleyan '42, A.M. *ibid.* '45, D.D. hon. Union '54, LL.D. Ohio Wesleyan '63), Tappan's successor in the presidency and at that time also Professor of Logic and Political Economy. On Chapin's resignation in 1868 Haven became Professor of Mental and Moral Philosophy.

Haven was, of course, a very able man, but philosophy was not his field. Even the students were aware of what was needed, for in the *Chronicle* (1: 25), we may read: "We want a man who has made this study his specialty and can infuse life into the dry bones of philosophical discussion." But when President Haven resigned in 1869, the Reverend Benjamin Franklin Cocker (D.D. DePauw '70) was appointed, a man of no university training at all in any subject, who, after an adventurous career in business, had drifted into preaching, in which occupation he had won fame for his eloquence. He occupied the chair of philosophy for fourteen years, that is to say, until 1883. On Cocker's behalf, however, it should be said that he was a man of vigorous personality and of a certain native acuteness of mind, that he exerted a large and beneficent influence on his students, and that he made a heroic effort to compensate for his shortcomings in education by prodigious labor and reading. The extent of his effort is apparent in the books he wrote during his professorial career: *Christianity and Greek Philosophy* (1870), *Lectures on the Truth of the Christian Religion* (1873), *The Theistic Conception of the World* (1875), *Evidences of Christi-*

anity (1882), and, finally, a *Student's Handbook of Philosophy* (1881). These books are for the most part of the defensive, apologetic type, and are constructed very largely from secondary sources. Greek philosophy, for example, is viewed as a mere preparation for Protestant Christianity. As for the chaotic *Handbook of Philosophy*, it must have been a heavy, indigestible meal for the students; yet with Cocker as the one who served it, they seem to have liked it. And, in his other works, there are occasional gleams of insight. Perhaps a summary of his report to the Regents (*P.R.*, 1871-72, pp. 38-39) will throw some light upon his ideas and methods of instruction. Regarding psychology as the fundamental study, "inasmuch as it deals with mental principles and laws which underlie logic and ethics," he had devoted the whole of the first semester to this study alone and had endeavored to do the work thoroughly. The second semester he said he had devoted to the teaching of history of philosophy, applied logic, and ethics, together with the bearing of these studies on the evidences of Christianity. Yet he gave small attention to this last in class, since it was the subject of his Sunday afternoon lectures. He regretted that he had not found a textbook in metaphysics, but hoped to prepare one himself. (As we have seen, this hope was fulfilled.) He wished that he could have two hours a day with his class and that the professor of moral and intellectual philosophy could be relieved of other work. (He was in charge of the instruction in social science as well as of that in philosophy.)

A new spirit came into the teaching of philosophy at the University when, in 1881, George Sylvester Morris (Dartmouth '61, Ph.D. hon. Michigan '81) was made Professor of Ethics, the History of Philosophy, and Logic, and Cocker became Professor of Psychology, Specu-

lative Philosophy, and the History of Religion. This spirit was part of a broader quickening of interest in the German idealism of Kant, Fichte, Schelling, and Hegel, and in the impact of the theory of evolution on philosophical thought.

Morris studied for the ministry in America and went abroad to study philosophy. On his return he sought an opening in the field of philosophy; but none offered itself until ten years later. Temporarily a tutor in the family of a wealthy New Yorker, he was invited by his old counselor, Professor Henry Boynton Smith of Union Theological Seminary, to translate into English and bring up to date the monumental *History of Philosophy from Thales to the Present Time* of Friedrich Ueberweg, a task peculiarly suited to him because of his intimate knowledge of both the German language and the history of philosophy, and which he performed so well that the work soon took its place as the authoritative English classic on the subject.

Called to the University of Michigan in 1870 on the initiative of Henry S. Frieze, Acting President after the resignation of President Haven, as head of the newly reorganized Department of Modern Languages and Literature, Morris immediately became a close friend of Professor Frieze, their common interest in music contributing to the union of two naturally congenial temperaments.

In spite of his influence in the University and his growing reputation as a philosopher both at home and abroad, it was not until eleven years later, again upon the initiative of Frieze, that Morris was appointed to a chair in philosophy at the University. In the meantime he contributed critical book reviews and original articles to the *Journal of Speculative Philosophy*, the *New England Magazine*, and to the Victoria Institute or Philosophical Society of Great Britain.

Morris soon found himself professor of philosophy in two outstanding universities, the Johns Hopkins University and the University of Michigan. For President Gilman of Johns Hopkins, seeking a younger man scientifically trained in philosophy, first invited Morris to lecture in Baltimore during the month of January in 1878 and 1879; and then, recognizing his marked success, offered him a three-year appointment, on the condition that he would remain at Johns Hopkins through three months of each year. Thereupon Morris resigned his modern language professorship, but consented to teach until January, 1880, in place of his successor, who was absent on leave. Although he continued to maintain his home in the city, Morris was not on the Michigan faculty in 1880-81, and it was only when he was about to leave Ann Arbor that the local authorities bestirred themselves and offered him a chair on his own conditions, viz., that he be allowed to spend the first semester of each year lecturing at Baltimore and the second semester in Ann Arbor. This arrangement continued for four years, as a year or more elapsed between the death of Cocker in the spring of 1883 and Morris' decision to leave Baltimore after the first semester of 1884-85. In the eight years he taught at Johns Hopkins, Morris contributed to the molding of a remarkable group of young scholars, among whom were John Dewey, Joseph Jastrow, Henry L. Osborn, Benjamin C. Burt, W. H. Howell, Allan Marquand, Richard C. Burton, and Fred M. Taylor. His lectures at Johns Hopkins furnished the occasion for the writing of his first book: *British Thought and Thinkers*. He finally took leave of Johns Hopkins and his philosophical friends there at the meeting of the Metaphysical Club on January 27, 1885.

In complete charge of the department from the year 1884-85, Morris called to

his aid one of his most brilliant pupils at Johns Hopkins, John Dewey (Vermont '79, Ph.D. Johns Hopkins '84, LL.D. Michigan '04), with whose enthusiastic co-operation he proceeded to change profoundly the orientation, and enlarge the scope, of the instruction in philosophy. While fulfilling his dual role of philosopher at Baltimore and Ann Arbor, Morris introduced on a broad scale the study of German idealism with which he had become imbued during his student years abroad. He is reported to have admitted that he was "saved by Hegel"—by which he meant that, having lost the orthodox Puritan faith of his fathers, during his years of critical study, it was Hegel who furnished him with a new intellectual framework within which he could reincorporate and reaffirm, freed from their theological trappings, the greater number of the older values to which he remained loyal.

The outstanding expression of Morris' thought is to be found in the conception and the working out of the series of philosophical monographs published between 1884 and 1890 by S. C. Griggs and Company of Chicago under the title "German Philosophical Classics for English Readers." This series still stands as the most complete exposition of German idealism in English. As editor, Morris not only conceived the general scope of the series and made the assignments, but also himself contributed two of the most important volumes: Kant's *Critique of Pure Reason* and Hegel's *Philosophy of the State and of History*. The untimely death of Morris brought the series to an end in 1890.

The change in the orientation of philosophy at Michigan during the Morris regime is further indicated by the new courses of study introduced. Already, while he was on part time at Ann Arbor, Morris had offered such new courses as the History of German Philosophy, Sci-

ence of Knowledge as Developed in Aristotelian and Post-Kantian German Philosophy, Seminar in Kant, and the Philosophy of the State with special reference to Aristotle, Hegel, and Mulford's *The Nation*. Professor George H. Howison (Marietta '52, LL.D. *ibid.* '83, LL.D. Michigan '09), later so influential in establishing the idealistic tradition on the Pacific coast, had given in the first semester of 1883, during Morris' absence in Baltimore, a course called Speculative Philosophy. Free after he accepted the permanent headship of the department in 1884 to revamp the curriculum as he desired, with Dewey's co-operation, Morris not only extended the standpoint of German idealism to the Philosophy of the State and of History, to the Philosophy of Religion, to Aesthetics, and to Real Logic, but he also firmly established the seminar in the study of Kant, Hegel, speculative philosophy, and Herbert Spencer. At the same time Dewey devoted himself primarily to psychology in various new courses: Empirical Psychology, Special Topics in Psychology (Physiological, Comparative, and Morbid Psychology), Psychology and Philosophy, Speculative Psychology—courses which found expression in his first book, *Psychology*, published in 1887 and used as a textbook at Michigan for ten years.

After four years of the most intimate and single-minded co-operation with Morris, Dewey, who had meanwhile become Assistant Professor, was called to the University of Minnesota in 1888 and was replaced at Michigan by Williston Samuel Hough (Ph.M. '84), a thorough idealist in outlook, who, in turn, later replaced Dewey at Minnesota.

But Dewey's career at the University of Michigan was not ended. During the spring vacation of 1889, while camping at his near-by lake cottage with his son, Morris contracted pneumonia and died on March 23. Dewey was immediately

recalled as Professor of Philosophy and head of the Department of Philosophy.

The Dewey regime (1889-94) continued ostensibly the general orientation which Morris had established. Yet some subtle and profound changes began to manifest themselves in Dewey himself, in the courses offered, and in the kind of men with whom he surrounded himself. Dewey, as a pupil and co-worker with Morris, had been written down by the philosophical public as an idealist. But there was already evident in his thinking the dominance of two new influences: functional psychology and the evolutionary theory of Darwin and Spencer. In his *Psychology* (1887) he had already interpreted concepts as "plans of action" and psychological processes as functional modes of response. Two small books on ethics, both written primarily for his own classes and published by George Wahr in Ann Arbor—*Outlines of a Critical Theory of Ethics* (1891) and *The Study of Ethics: A Syllabus* (1897)—were impregnated with the notions of the organic unity of the individual agent and his environment and the evolution of both through the acts of postulating of the agent. In these writings the germs of Dewey's later instrumentalism are evident.

Dewey himself turned over the courses in psychology more and more to his younger colleagues and interested himself in ethical and social problems, as evidenced by his giving such courses as *Anthropological Ethics*, the *Theory and Institutions of Social Organization*, *Special Studies in the History of Political Philosophy* (topic changed each year), *Movements of Thought in the Nineteenth Century*, and *Political Philosophy or Ethics of Human Relations*.

Very much interested in the theory of education, John Dewey was one of the prime movers in founding the Michigan Schoolmasters' Club, to which he made

some of his earlier contributions on education, and, sympathetically seconded by Mrs. Dewey, he attempted to try out his theories on his own children—with the result that old Ann Arborites still regale one another with tales of how the Dewey methods worked.

Among the men outside of the Department of Philosophy whom Dewey influenced most profoundly were Fred Newton Scott, whom he drew into the department to give a course in aesthetics and with whom he carried on a seminar in aesthetics; Charles Horton Cooley, later Professor of Sociology, who carried out exhaustively Dewey's principle of the organic unity of the individual and society; and James Rowland Angell, afterward professor of psychology at the University of Chicago and later president of Yale University, who developed his theory of functional psychology.

Within his own department of study Dewey's influence was even greater. He grouped about him a number of young men exceptionally able and singularly loyal to himself and his ideas. Two of these were James Hayden Tufts (Amherst '84, LL.D. *ibid.* '04, B.D. Yale '89, Ph.D. Freiburg '92), Instructor, 1889-91, and George Herbert Mead (A.B. Oberlin '83, A.B. Harvard '88), Instructor and Assistant Professor, 1891-94. When John Dewey went to the University of Chicago as head of its department of philosophy in 1894, Mead accompanied him. Tufts had begun his work at Chicago immediately after receiving the doctor's degree at Freiburg in 1892. These two continued to be Dewey's most ardent collaborators in the development of the doctrine of pragmatism, or, as Dewey has always preferred to christen it, instrumentalism. Since these ideas were already germinating in the minds and teachings of Dewey, Tufts, and Mead while they were in Ann Arbor, it may not be too much to claim that the University of Michigan



Harry Burns Hutchins

HARRY BURNS HUTCHINS

was one of the cradles of the new philosophy which later became more distinctively identified with the University of Chicago.

Another young man, Alfred Henry Lloyd (Harvard '86, Ph.D. *ibid.* '93), called from Harvard in 1891 just as he returned from two years abroad as the Chapman traveling fellow, became a devoted friend and admirer of Dewey. A pupil of Josiah Royce and William James at Harvard, but falling under the spell of Dewey at the University of Michigan, Lloyd characterized his philosophy as "dynamic idealism," the title of his most typical work, published in 1898. In agreement with Dewey, Lloyd always started from the active, creative, achieving life of the human person; but, unlike Dewey, and more in accord with Royce, he insisted that this active life implied a complete idealistic interpretation of the universe. Lloyd, like Royce, was essentially a metaphysician. An earlier work, *Citizenship and Salvation; or, Greek and Jew* (1897), a comparative study of the epochs of which Socrates and Jesus were the concrete embodiment, is a speculative interpretation of history somewhat after the manner of Fichte and Hegel. Such a speculative interpretation, expressed in a more comprehensive form in *Philosophy of History* (1899), was especially congenial to his mind, and he tended to carry it out in his studies of ethics, of the theory of the state, and of religion. Two other works, *The Will to Doubt* (1907) and *Leadership and Progress* (1922), set forth the bases of his profound and uncompromising liberalism. Numerous studies along the lines enumerated, which appeared from time to time in various periodicals and reviews, have unfortunately never been published in book form.

Lloyd was not the expounder of a tradition like Morris or the creator of a school like Dewey. His philosophy was

peculiarly his own, too subtle and too varied in its different expressions to be crystallized into the principles and program of a group of disciples. But the influence of Lloyd, the thinker, inseparable from Lloyd, the man, on his pupils was quite remarkable.

On the departure of Dewey, accompanied by George H. Mead, for Chicago in 1894, Lloyd was honored with the administration of the Department of Philosophy for two years, 1894-96. During these years he called successively two Harvard doctors of philosophy to take charge of the work in psychology: John Bigham (1894-95) and Edgar Pierce (1895-96). Neither of these men stayed long enough to make any contribution to the philosophical tradition, and both abandoned philosophy as a profession shortly after their departure.

A third man who became associated with the department during Lloyd's interim administration is best known and remembered for the prominence and development he gave to the study of aesthetics, begun by Dewey and Fred Newton Scott: George Rebec ('91, Ph.D. '97), 1894-1909, an unusually enthusiastic and dramatic lecturer and teacher, who stimulated an interest in literature from a new point of view, and, especially in his course, *Principles and Problems of Aesthetic History*, attracted hundreds of students from the various language departments into philosophy. Rebec has found, since 1909, as director of philosophical studies, dean of the Graduate School, and director of the educational and civic services of the University of Oregon at Portland, an even larger field for his rare talents as an initiator of new interest in philosophy.

During Lloyd's acting directorship the University sought an older man with wider experience to carry out the tradition established by Morris and Dewey. Such a man was finally found in the per-

son of Robert Mark Wenley (A.M. Glasgow '84, Ph.D. *ibid.* '95, LL.D. *ibid.* '01, Sc.D. Edinburgh '91), who was the head of the department from 1896 till his death in March, 1929.

Lloyd was later entrusted with large responsibilities in the administration of the University. Charged with the secretaryship of graduate studies when these were still a department superimposed on the Literary College, he was later honored, when the Graduate School was established, with the deanship for eleven years, from 1915 till his death on May 11, 1926. In 1925, in the interim between the presidency of Marion L. Burton and that of Clarence C. Little, he was Acting President. In the midst of his many and exacting administrative duties he continued to exert, through his classroom instruction, his consultations with advanced students, and his publications, a marked influence on philosophical thought. His sudden death brought to an untimely end a rare personality.

Wenley and Lloyd, during their thirty years of association together, co-operated with rare personal loyalty and singleness of purpose in consolidating and developing the Department of Philosophy, with the result that they saw its enrollment increase proportionately much more rapidly than did the enrollment in the Arts College. During this period the study of psychology, which had been initiated by Dewey, was gradually expanded and developed, under the direction of Walter Bowers Pillsbury (Nebraska '92, LL.D. *ibid.* '34, Ph.D. Cornell '96), till finally, affiliated more and more with the biological, medical, and social sciences, it was practically a separate department. At the death of Professor Wenley in 1929, this separation was made official.

The appointment of Robert Mark Wenley undoubtedly inaugurated the most significant period in the history of the teaching of philosophy at the Univer-

sity of Michigan; it was not only the longest period of leadership by one man, during which the greatest expansion in the number of the personnel of the department, the variety of special subjects taught, and points of view represented occurred, but also the period during which the department achieved the greatest renown, both within the state and throughout the nation.

Like other distinguished members of the faculty, Wenley came from a foreign country and brought a stimulating contrast of tradition and point of view. Yet the cultural background out of which his life emerged was in all essentials the same as the hitherto dominant American type. For he was brought up in a strictly religious, sober, industrious, and rather conventional, upper-middle-class family of successful Scotch Presbyterian business folk. Moreover, the moral temperament of Glasgow, where he spent his childhood and youth, had many of the characteristics of the large American city "on the make"—optimism, bustle, unreflecting self-confidence, and respect for worldly success earned by productive and beneficent personal talent and effort. When he came to America, therefore, he possessed a basis upon which to carry through the difficult process of adjustment to his new home. Through the smoke of Glasgow's steadily multiplying plants and the ships crowding her harbors, the young Wenley might be said to have already glimpsed something of the American scene which he was afterward to feel so heartily. "When I made my great adventure," he wrote in his unpublished autobiography, "and removed my family and goods and chattels to the United States, I drove from my house to the steamer, two miles off, and so sailed straight into the setting sun, into untried vasty possibilities." Although the formative years of his life were spent in Glasgow, he was born in Edinburgh,

July 19, 1861. Receiving his university education at Glasgow University, he continued his studies in Paris, Rome, and Florence; he recognized a debt to Lord Kelvin, Richard Jebb, and John Nicol, among his Glasgow teachers, and to the Scottish preacher John Service, but the great influence in his intellectual life was Edward Caird, to whose teaching he remained faithful all his life.

Already before he was invited at the early age of thirty-five to head the department at the University of Michigan, Professor Wenley had had a distinguished career as a teacher of philosophy in Scotland. He had occupied various positions at Glasgow and Queen Margaret College and had received many prizes and honors in philosophy and theology—among the latter, an honorary vice-presidency of the Teachers' Guild, a life fellowship of the Royal Society of Edinburgh, a fellowship of the Royal Society of Literature, and membership in the Aristotelian Society.

Thus, despite his comparative youth, Wenley came to his work at Michigan with a splendid training and many years of experience. In any account of the significance of this work, his importance as a teacher should take first place. His was a subject which, because of its critical and controversial spirit and the high generality of its basic concepts, presents peculiar difficulties to the mind of the immature student. Yet, because he knew life equally well with books, he was able to show the connection of these concepts with even the most familiar and commonplace affairs—like Socrates, bringing philosophy down to earth and within the reach of the average intellect. He vivified exposition with imagination and seasoned it with a keen wit, which, though it often disconcerted the unwary, made them, as he often said, "sit up and take notice." He created a direct personal contact between himself and the students

by doing what people who had never heard him lecture would deem impossible—dramatizing philosophy. Thus he made plain to them that their own problems were problems of philosophy and that only through philosophy, in the broad sense, could they be solved. If at the beginning they were puzzled and felt their moorings in tradition shaken, in the end, many left college with the conviction that they owed to him as to no one else, a new and saving perspective upon life. Moreover, his relationship with his students did not end with graduation; for he followed many of them with help and guidance throughout their later careers. The typical courses that he gave for undergraduates were an introductory course in problems and methods—the enrollment in this course reached six hundred at one time—and a course in ethics, varying in content from year to year, in which he illustrated moral principles through a survey of some highly significant period of cultural history.

Though supreme in the difficult business of initiation into philosophy, it was as a teacher of graduate students that he could, and did, most fully use the equipment of his ripe scholarship. The character and method of his more advanced teaching is described by one of his pupils as follows:

In his seminar he did not pursue the easy method of having his students do the work, but himself always did the giving. On the one hand, encouraging mature students by quietly assuming that they could work independently, without constant supervision, on the other hand, consciously guiding and inspiring that independent effort by dint of continual giving without stint, he united successful inspiration with fruitful communication of knowledge. It was always evident that what was given was the result of prodigious effort and meticulous preparation. In his seminars in Kant, Hegel and the philosophy of religion, he ever offered the most solid of solid meat. But even then,

though no longer under the necessity of dramatic presentation to retain the attention of large groups of undergraduates, the solid meat was spiced with the characteristic "Wenleyisms" without which he could not have been what he was. His graduate lectures not only manifested his astounding erudition, but patently bore the impress of his own convictions. Though in no sense attempting to proselyte, he did frankly and vigorously express his own philosophical and religious convictions to his graduate students. Such factors as these undoubtedly account in large measure for the increasing number of students who were attracted to him for their professional training in philosophy, with and for whom he so enjoyed working.

Not only was Professor Wenley influential as a university teacher; he also did very effective work as an extramural lecturer. Already, in Britain, before he came to America, he had distinguished himself by his university extension work and as a public speaker. And from the date (1911) when University Extension became a part of the regular program of the University, Wenley was one of the professors most in demand.

Despite his varied activities as teacher, lecturer, and administrator, Wenley found time and energy for an amazing literary output. The total list of his publications contains over six hundred titles. A large number of these are, to be sure, reviews of books. He was rather too generous in giving himself to this valuable, but ephemeral and unhonored and unremunerated, work. But, counting out the reviews, we find over two hundred encyclopedia articles, some fifty technical articles and as many more on educational and literary subjects, several pamphlets, and ten books. Many of the encyclopedia articles were contributed to Baldwin's *Dictionary of Philosophy and Psychology*, for which he drew up the list of names in philosophy and religion, and to Hastings' *Encyclopedia of Religion and Ethics*. Four of his books, including his

maiden volume, are in the field of the philosophy of religion. Of these, *Socrates and Christ* (1889), *Contemporary Theology and Theism* (1897), and *The Preparation for Christianity in the Ancient World* (1898) are mainly historical and critical in import, whereas the Baldwin lectures, *Modern Thought and the Crisis in Belief* (1909), are of a more constructive character. Four more are in the field of the history of philosophy—*Aspects of Pessimism* (1894), *An Outline Introductory to Kant's "Critique of Pure Reason"* (1897), *Kant and His Philosophical Revolution*, in the "World's Epoch-Makers Series" (1910), a book highly praised even by German critics for its profound and acute scholarship, and *Stoicism and Its Influence* (1924), being No. 21 of the series, "Our Debt to Greece and Rome." The volume entitled *The Anarchist Ideal, and Other Essays* (1913) consists of essays on anarchism in the ancient world, on Plutarch, physiological psychology, heredity, and the university in the United States. Last, there is his contribution to the University of Michigan scholarly publications, *The Life and Work of George Sylvester Morris* (1917), notable not only as a graceful and sympathetic biography of a former professor in the department but as a penetrating study of the background of thought and culture in the United States in the nineteenth century. He also made an extensive contribution to *The Life of Robert Flint*, by Donald Macmillan (1914). Mention should be made of the delightful literary essays which he wrote as recreations, such as the essay, "Marian Evans and George Eliot," in the *Washington University Studies* (Ser. II, Vol. IX [1921], No. 1), *Poems of John Davidson, Selected, with an Introduction and Bibliography*, in the "Modern Library" (1924), and the two essays on Kipling published in the *Inlander*, March and April, 1899. Finally, there

should be mentioned the partly autobiographical, partly philosophical, contribution to the second volume of *Contemporary American Philosophers*, in the "International Library of Psychology, Philosophy and Scientific Method." As expressed in his writings and lectures, Professor Wenley's general philosophical position may be described, I think, as Hegelianism of the Right, interpreted in terms of his Scotch pietism, and modified by a certain skepticism born of his knowledge of science. Profoundly religious, even mystical by training and conviction, a Christian and a church member, he was yet skeptical of the sanctity and literal truth of creeds and dogmas. On the other hand, he knew the history of thought too well to be swept off his feet by fashionable currents of opinion in religion and philosophy. Although he never developed an original system of thought in any of his writings, all of his publications in whatever field are distinguished by broad and accurate learning, knowledge of the human spirit, especially in its relation to its historical and social background, and, particularly in the writings of his later period, by a brilliant, epigrammatic, characteristic style. To his students who followed his advanced courses and knew what lay unwritten in his mind, it will always be a matter of regret that he never found the opportunity to bring to completion a systematic work on the philosophy of religion.

During the headship of Professor Wenley, the work of the department grew to such an extent that, in addition to the collaboration given by Professor Lloyd, it became necessary to appoint new members to the staff. Among those who were appointed, the following became permanent members of the department and are now carrying on in the room of Professors Wenley and Lloyd—two University of Michigan men, Charles Bruce Vibbert ('04) and Roy Wood Sellars ('03,

Ph.D. '09), appointed in 1905, and, after George Rebec's resignation, DeWitt Henry Parker (Harvard '06, Ph.D. *ibid.* '08).

On the death of Wenley and the separation of philosophy from psychology, the old headship system of organization was abandoned in the department in favor of the chairmanship system. DeWitt Parker was appointed Chairman in 1929. In 1935 the department was further reorganized along "democratic" lines through the adoption of a written constitution giving authority to the department as a whole, including instructors, with regard to all matters concerning appointments, promotions in rank and salary, and educational policy. In 1940 the department consisted of six men, excluding teaching fellows, the three new members being Professor Cooper Harold Langford (Clark '21, Ph.D. Harvard '24), who was appointed in 1929, and Assistant Professors Paul Henle (Harvard '29, Ph.D. *ibid.* '33) and William Frankena (Calvin '30, Ph.D. Harvard '37), both appointed in 1937.

The following books, exclusive of those that may be regarded as primarily of the textbook variety, have been published by present members of the department: Cooper H. Langford, *Symbolic Logic* (in collaboration with Clarence I. Lewis, 1932); DeWitt H. Parker, *The Self and Nature* (1917), *The Principles of Aesthetics* (1920), *The Analysis of Art* (1926), *Human Values* (1931), and *Experience and Substance* (1941); Roy W. Sellars, *Critical Realism* (1916), *The Next Step in Democracy* (1916), *The Next Step in Religion* (1918), *Essays in Critical Realism* (1921), *Evolutionary Naturalism* (1922), *The Principles and Problems of Philosophy* (1926), *Religion Coming of Age* (1928), and *The Philosophy of Physical Realism* (1932).

DEWITT H. PARKER
CHARLES B. VIBBERT

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THE DEPARTMENT OF PHYSICS

THE subject of physics was first taught in the University in the autumn of 1843, under the name of natural philosophy. Some eleven juniors constituted the first class, and the instruction was conducted by George Palmer Williams (Vermont '25, LL.D. Kenyon '49), who also taught mathematics under the title of Professor of Natural Philosophy and Mathematics. From this modest beginning there has been a continuous evolution into the present Department of Physics, comprising in the various ramifications of its activities a staff of some sixty men, including assistants and technicians, and occupying two large buildings.

In Detroit, first as the "Catholepistemiad, or University of Michigania" in 1817, then as the University of Michigan in 1821, the institution had been unable to find sufficient students of collegiate grade. It had therefore confined itself largely to secondary instruction, and for a time continued to do so even when, on Michigan's admission to statehood in 1837, the Board of Regents was estab-

lished and the site at Ann Arbor was determined upon. Regular university instruction began in Ann Arbor only in 1841. At the same time the Regents withdrew a large part of the support which they had been pouring into the several University-sponsored and University-controlled secondary schools about the state, called branches (see Part I: EARLY HISTORY and BRANCHES).

In anticipation of the opening of the central institution, the Regents, in July, 1841, appointed George P. Williams to be Professor of Languages; but in August, upon his own request, they made him Professor of Mathematics instead, and appointed the Reverend Joseph Whiting to the professorship of languages. Both took up residence in Ann Arbor in September, and, announcement having been previously made that college instruction would begin, seven students presented themselves. Only freshman and sophomore classes were organized the first year; the sophomore class consisted of one student, who was later absent for one year, but returned

and graduated with the class below in 1845. The subjects of instruction consisted of mathematics and the ancient languages and literature. Professors Williams and Whiting constituted the entire resident staff.

During the next academic year, 1842-43, the same subjects of instruction were continued for the original class, now sophomores, with a brief course in logic perhaps added. Some additional students joined this class from time to time, and a new freshman class had entered.

In the third and fourth years of the curriculum the study of the ancient languages was much reduced and natural philosophy, astronomy, chemistry, zoology, geology, and some of the social sciences were studied. The academic year was at first, and until 1856-57, divided into three terms.

By the autumn of 1843, according to the *Catalogue*, Williams' title had been changed to Professor of Natural Philosophy and Mathematics, and, as previously stated, he conducted the instruction of the first class in natural philosophy, consisting of junior students; the instruction was given in the first and second terms of the third year of the curriculum.

The textbook was the two-volume *Introduction to Natural Philosophy* by Denison Olmsted, professor of natural philosophy and astronomy in Yale College. This was first published in 1832. In 1837 the same author published also a more elementary text in one small volume, for "schools and academies." A copy of the elementary text is at hand, but the college text in its two-volume form is not available. After several revisions, however, the college text was stereotyped in 1844 and was thereafter issued in a single octavo volume of nearly six hundred pages, as occasion demanded. In an 1858 reprint of this text, which is at hand, mechanics, acoustics, electri-

city, magnetism, and optics are treated.

The text is on the whole thorough and excellent, but under electricity, to which seventy pages are devoted, not a word is said on the subject of electric currents, for the reason that "in Yale College, Galvanism and its kindred subjects are assigned to the chemical department." Thus Ohm's law, which had been announced in 1826, is not mentioned; moreover, under magnetism nothing is said concerning Oersted's epoch-making discovery made in 1820, of the effect of the electric current on the magnetic needle, nor of the equally momentous discoveries made some twelve years later by Faraday and by Joseph Henry of the phenomena of electromagnetic induction and of self-induction.

This is strange, especially in view of the fact that Joseph Henry's work was carried on first at Albany and then at Princeton, two cities both rather near New Haven. Were the Yale chemists appropriating all of these marvelous advances in physics of the time, or were these great discoveries as yet too little understood to permit of treatment in a college text? In the part of the book which is devoted to optics, the phenomenon of polarization by reflection, discovered by Malus in 1808, is adequately treated, as is also Fraunhofer's discovery of the dark lines of the solar spectrum, announced in 1817. But Young's development of the principle of interference, 1801-4, is accorded only a few sentences (with no mention of Young's name), and Fresnel's great researches of the years 1815-24 are ignored (though Fresnel is incidentally mentioned in a footnote).

In the early years at Ann Arbor, as elsewhere at the time, instruction was almost entirely from textbooks. Recitation of subjects assigned for study consumed the greater part of the class periods, combined, of course, with discussion. Lec-

tures were only occasional, and there were no demonstration lectures, which we now hold as important in the experimental sciences. Moreover, the student was offered no opportunity whatever to carry out experiments for himself. Laboratory instruction in physics at the University lay as yet nearly forty years in the future.

During the decade 1843-53 the instruction in physics was conducted in the manner just outlined.

Williams, as senior member of the faculty, and through his genial spirit coupled with an alert mind and kindly humor, held a unique place in the University during its first forty years at Ann Arbor. A multitude of students came to him for counsel, and all loved him. To them he was affectionately known as "Punky." But, though revered, he did not escape the crude pranks occasionally played by the students in the early days. It is recorded that early one morning the students led a donkey into his classroom, and tied it behind his desk. When he entered, the students were all in their seats. He bowed and said, "Good morning, gentlemen! I see you have no need of me this morning, having already provided yourselves with an instructor fully qualified to instruct you," and thereupon he walked out.

While Professor Williams was now by career a mathematician and natural philosopher, he maintained his interest in languages and in theology, in both of which he was proficient. Throughout his life he was deeply religious and had had and retained a desire to be some day ordained a minister. Once he had been accepted for ordination, but he then refused because of doubts in regard to his own worthiness. At length he was ordained, in 1846, as a minister of the Protestant Episcopal church and subsequently, while retaining his duties at the University, served for about two years as

rector of Saint Andrew's Church of Ann Arbor, without salary, in order to help this church out of financial difficulties.

President Tappan, who entered upon his duties in the autumn of 1852, at once wisely stressed the need for augmentation of the faculty. Inasmuch as Williams had become overburdened in his dual professorship of mathematics and natural philosophy, and since a need for an engineering course had developed, Tappan urged the appointment of a professor of physics and civil engineering. The Regents created the proposed professorship and selected a man recommended by the Reverend Erastus Haven, then Professor of Latin in the University and later its President, as well as by the famous botanist Louis Agassiz and others, as an individual of superior and versatile attainments, qualified to hold a professorship in almost any branch of science.

The man in question was Alexander Winchell (Wesleyan '47, LL.D. *ibid.* '67). He was called in the autumn of 1853, but was delayed until January, 1854, in Alabama, where he had been teaching, by an outbreak of yellow fever. Immediately after his arrival Winchell entered upon his new duties, and by the autumn of 1854 the title and functions of George P. Williams had been limited to those of a professor of mathematics, as Winchell was filling the professorship of physics and civil engineering. It devolved upon Winchell, moreover, to select and purchase the first physical apparatus for the University, an initial appropriation of \$500 having been made for this purpose.

Unfortunately, Winchell soon fell into disfavor with President Tappan. Probably the chief source of their discord was personal incompatibility, but in any event Tappan felt that Winchell had been inattentive to his duties, and, after a year, effective in the autumn of 1855, had him transferred to what he consid-

ered a less important chair. Another factor in the situation may have been that Winchell's dominant interests were in fields other than physics and engineering. He subsequently had a distinguished career, principally as a geologist.

Simultaneously with the transfer of Alexander Winchell, Lieutenant William Guy Peck (U.S. Mil. Acad. '44, A.M. Trinity [Conn.] '53, LL.D. *ibid.* '63) was called to the chair of physics and civil engineering. Graduated first in his class at West Point, he had served in the Mexican War and then as an assistant professor of mathematics at West Point. He filled his professorship in Ann Arbor for two years, 1855-57, and then was called to Columbia University.

During the period of Peck's incumbency of the chair of physics the first Chemical Laboratory Building was erected. It was a small building which, after numerous and extensive enlargements, is now known as the Economics and Pharmacology Building. The facilities thus provided for laboratory work in chemistry were among the best of the day in America. At this University as well as elsewhere, chemistry was the science which first introduced laboratory instruction.

No provision had been made in the late summer of 1857 for the courses in physics and engineering for the coming year. At that time a recent graduate of the Rensselaer Polytechnic Institute stopped over in Ann Arbor, to visit the University, on his way to Chicago, where he intended to seek employment. He called upon President Tappan, and in the ensuing conversation Dr. Tappan suggested that the young man, DeVolson Wood by name, remain in Ann Arbor and for the time being undertake the instruction in the courses in question, with the understanding that he would have to content himself with such remuneration for this service as the Regents might

deem proper to allot to him. Wood accepted. He proved himself capable and was soon given an appointment as an assistant professor, which he held for two years. In June, 1859, he was made Professor of Physics and Civil Engineering, but he held this title for only one year.

The time was ripe for the creation of a separate professorship of engineering, and DeVolson Wood (C.E. Rensselaer Polytechnic Inst. '57, M.S. Michigan '59) was chosen for this chair. In 1860 James Craig Watson ('57, Ph.D. Leipzig '70), who had for a year been Professor of Astronomy, was appointed to the professorship of physics, which he held for the three years 1860-63. Williams then became Professor of Physics and retained this appointment until his retirement in 1875.

In 1871 George Benjamin Merriman (Ohio Wesleyan '63, A.M. Michigan '64) was transferred from an assistant professorship of mathematics to an adjunct professorship of physics. Williams was aging and needed relief from the burden of his post. In view of his long and conspicuous service, however, he was continued in the rank and with the salary of professor of physics, but without duties.

Merriman was the first native son of the state to have charge of or take part in the instruction of physics at the University. He was born at Pontiac on April 13, 1834.

The lecture rooms and chapel of University Hall were ready for occupancy in October, 1872 (the auditorium not until a year later), and the situs of the instruction in physics was now transferred to this new building; space was allotted in the southeast corner of the fourth floor. Just previous to this removal the classes in physics had been held in the North College (Mason Hall). In the very early years, when this was the only college building, the instruction in all branches of learning had been given there. Upon

completion of the South College (South Wing) in 1848, the classes in some subjects were transferred to it. Rather more likely than not, physics remained in the North College until removed to University Hall. A fact which bears upon this question but yet furnishes no definite clue is that the above-related donkey episode, which occurred in 1857, was reported concurrently in the *Detroit Free Press* as having taken place in the North College. But this episode occurred while Williams was Professor of Mathematics only. Mr. Levi Wines, an alumnus of keen intellect who entered the University in the autumn of 1870, stated that he, as a prospective freshman, went to interview Williams, at that time again Professor of Physics, and that Williams' office and classroom were then in the North College. Accordingly, the instruction in physics was either still or again being given in the North College. Mr. Wines could not recall with certainty just where within the North College Williams' rooms were situated, but he was inclined to believe that they were in the southeast corner of the second floor.

Mr. Wines also said that when he attended the course in physics, probably in 1872-73 and in any event during the years that it was conducted by Professor Merriman in University Hall, the course included lectures as well as recitations, and the lectures were accompanied by ample demonstrations. The students, however, were given no opportunity to perform experiments themselves. Also, the well-known Ganot's *Physics* was then being used as a text. This continued to be used for many years.

At this period the students annually celebrated at the conclusion of the course the "burning of physics" or the "burning of mechanics," which was a comic ceremony in which an effigy representing physics or mechanics was by way of climax to appropriate obsequies cast upon

a burning pyre. This custom originated in 1860 and was continued with perhaps an occasional omission until 1881. The class of 1875, moreover, feeling that the "burning of physics" was not enough, arranged in addition an entertainment in Hangsterfer's Hall in downtown Ann Arbor, of which the principal attraction was a parody on a demonstration lecture in physics—featuring experiments which didn't work!

In June, 1875, Merriman terminated his service at the University to accept the professorship of mathematics at Albion College. In the interim the alumni had generously raised a liberal pension fund for Professor Williams (see Part II: ALUMNI ASSOCIATION), and he was at this same time definitely retired with the title of Emeritus Professor of Physics. He continued to reside in Ann Arbor until his death on September 4, 1881, at the age of seventy-nine years.

John Williams Langley (Harvard '61, M.D. hon. Michigan '77, Ph.D. hon. *ibid.* '92), a brother of the famous Samuel Pierpont Langley, replaced him. A graduate of the Lawrence Scientific School of Harvard, Langley had studied medicine for a year at Michigan, and had been in succession an acting assistant surgeon in the United States Navy, an assistant professor of natural philosophy at the Naval Academy, and a professor of chemistry at the Western University of Pennsylvania. He conducted the instruction in physics here for two years in conjunction with work in chemistry, under the titles of Acting Professor of General Chemistry and Physics for the year 1875-76 and Professor of the same subjects during 1876-77. Thereafter, he was Professor of General Chemistry only.

In the autumn of 1877 Charles Kasson Wead (Vermont '71, A.M. *ibid.* '74) assumed the work in physics under the title of Acting Professor of Physics. He had done graduate study in this country, and

this was followed by three years of teaching and a year of study in Berlin. Under C. S. Wead the first instructional laboratory in physics was inaugurated in February, 1878; it extended along the east side of the fourth floor of University Hall. Wead's field of principal interest was acoustics. He remained at the University until 1885 and then, or soon after, returned to the East. After a period of some years he entered the United States Patent Office.

During the year 1885-86 the professorship of physics was vacant. To provide instruction in the interim, however, Mark Walrod Harrington ('68, A.M. '71, LL.D. '94), Professor of Astronomy and Director of the Observatory, assumed temporary charge of the courses in physics, and DeWitt Bristol Brace was Assistant Professor of Physics from February until June. The latter subsequently became a professor of physics at the University of Nebraska.

Henry Smith Carhart (Wesleyan '69, Sc.D. Northwestern '12, LL.D. Michigan '12) assumed his duties in the fall of 1886 with the title of Professor of Physics and remained at Michigan in that capacity until 1909. He came from Northwestern University, where he had been for fourteen years. Born at Coeymans, New York, on March 27, 1844, he had obtained his bachelor's degree at Wesleyan University, Middletown, Connecticut, and had then studied at Yale for a year before going to Northwestern.

When Carhart arrived the time was ripe for the erection of a laboratory building for physics and hygiene. Construction was begun in 1887, and the building was ready for occupancy in the autumn of 1888. The original Physics Building was considerably enlarged on its west side in 1905, the added part including the room known as the West Lecture Room. The structure is now called the West Physics Building.

With the facilities provided by the completion of the Physics Building in 1888 the functional activities in the field of physics at the University began a rapid advance in status and expansion in scope. Playing equally important roles in bringing about this advance and expansion were two additional factors. First, the University as a whole was growing and maturing rapidly, and second, a great developmental influence was exerted personally by Carhart, through his energy and ability as a scientific investigator. He was internationally known for his contributions to the progress in electricity which was being made in his day. In 1890 the additional title of Director of the Physical Laboratory was conferred upon Carhart.

During the decade 1890-1900 several appointments were made in physics in the ranks of instructor, assistant professor, and junior professor, with advance in rank of the incumbents from time to time. There thus evolved during this decade what may properly be called a staff in physics and a Department of Physics. Those holding appointment continued in the department into the new century.

The six men conducting the instruction in physics in 1901-2 included two recent additions and were as follows: Henry Smith Carhart, Professor of Physics and Director of the Physical Laboratory; John Oren Reed ('85, Ph.D. Jena '97), Junior Professor of Physics; Karl Eugen Guthe (Ph.D. Marburg '89), Assistant Professor of Physics; Harrison McAllister Randall ('93, Ph.D. '02), Instructor in Physics; George W. Patterson, Junior Professor of Electrical Engineering; and Benjamin F. Bailey, Instructor in Electrical Engineering. Of these six, it is rather remarkable that all have been, or are at present, heads of departments in the University, and three have been deans. Carhart was succeeded

as Director of the Physical Laboratory by Reed, Guthe, and Randall, in the order named. Randall continued as Director until his retirement in 1941, when Ernest Franklin Barker (Rochester '08, Ph.D. Michigan '15) was made Chairman of the Department of Physics. Patterson became the head of the Department of Electrical Engineering in 1905 and continued in that capacity until 1915. He was also head of the Department of Engineering Mechanics from 1914 until his death in 1930. Bailey became the head of the Department of Electrical Engineering in 1922, and holds that position at the present time (1942). The three who became deans were John O. Reed, who was the first Dean of the Summer Session and later was Dean of the Literary Department, Karl E. Guthe, who was chosen the Dean of the Graduate School upon its reorganization in 1912, and George W. Patterson, who was Assistant Dean of the Engineering College from 1922 to 1927, Acting Dean for the year 1927-28, and Associate Dean 1928-30. Dean Patterson died May 22, 1930. For many years he conducted the more advanced courses in electricity in the Department of Physics, even after his title became Professor of Electrical Engineering. He was joint author with Professor Carhart of a textbook, *Electrical Measurements*, which was in use for a number of years. Perhaps one of the most popular high-school texts on physics was one known as Carhart and Chute, from the names of the authors. The second author was Horatio Nelson Chute ('72, A.M. '75, LL.D. Denison '09), of the Ann Arbor High School. Carhart's *Physics for University Students* was also used as a text in the courses in general physics, especially by engineering classes. His most important contributions to physics were on electrical and electrochemical subjects. He established courses in electrochemistry in the physics curriculum, and

was an authority on standard cells. He was made Professor Emeritus in 1909 and died in 1920. Most of his years after retirement were spent in California.

Professor Reed is remembered by all his students as a very vigorous and efficient teacher, who had little patience with sham and nonsense, but who labored with boundless energy to aid those who proved themselves capable and eager to learn. His interest was principally in the subjects of sound and light, and he prepared excellent laboratory courses in those branches. In March, 1912, he obtained a leave of absence because of illness. He died January 23, 1916.

Karl E. Guthe, after having been a member of the Department of Physics for some years, resigned and engaged in research at the Bureau of Standards from 1903 to 1909, then returned as Professor, and later succeeded John O. Reed as Director of the Physical Laboratory. Together with Reed he published *College Physics*, a text which enjoyed wide use in courses in general physics. Guthe's reputation for scholarship and research made him the choice for the first Dean of the Graduate School. Unfortunately, his inspiration and services in this capacity were cut short by his sudden death in Oregon, September 10, 1915.

The death of Professor Guthe occurred so near the opening of the school year that there was practically no time left for his successor to make plans to carry the load thus suddenly thrust upon him. Upon H. M. Randall devolved the responsibility of directing the affairs of the department and of providing for the needs of graduate students, who were coming in increasing numbers. How well he assumed these duties is indicated by the enormous increase of the research facilities and activities of the department under his directorship, by the large number of students pursuing advanced work, and by the expansion of the teaching

curriculum to include instruction in the most modern and advanced aspects of physics. Randall is a joint author, with N. H. Williams and W. F. Colby, of *General College Physics*, a text which is used at present in the general physics classes of the University. His major research interest is in radiation, particularly that of the infrared region of the spectrum. To this field he has made fundamental contributions, important not only for the information they yield, but even more because of the extensive developments that have followed, in which similar methods have been utilized. His own investigations and those of his associates have brought to the laboratory high distinction, and established it as a leading center for infrared research. Randall in 1937 was president of the American Physical Society.

THE COURSES OF INSTRUCTION.—Until about 1880 it could scarcely be said that anything beyond elementary physics was offered in the courses of instruction. Under C. K. Wead, however, more work in optics, acoustics, and electrical measurements was initiated. Commercial applications of electricity had been developing rapidly, and soon after Carhart took charge in 1886 new courses began to appear. Thus, in 1888 was instituted a course in dynamoelectric machinery, and in 1889 there were courses in mathematical electricity, in electric batteries, and in the photometry of electric lamps. In 1891-92 were added the study of transformers, more laboratory work in electricity, and the theory of light. A course in the theory of heat was first offered in 1893-94, and advanced studies in sound and light in 1895-96. The courses in sound and light were taught by John O. Reed; those in electricity were given by Carhart and Patterson.

In the year 1900-1901 a colloquium was added, for which one hour of credit was given each semester. In this collo-

quium advanced students joined with the teaching staff in presenting reports on research and on other topics of interest.

Although the courses in general physics have been modified from time to time to meet the needs of those preparing for the different professional schools, it may be said that since 1887 a full year's course of at least five class or laboratory periods per week has been given. At present the students preparing for medicine, dentistry, and pharmacy take the same course in physics as those in the College of Literature, Science, and the Arts. Of engineering students an additional amount of work in the solution of problems is required.

The subject of thermodynamics had been well developed for many years previously, but there was not sufficient demand for advanced study in this subject until the year 1901-2, when Karl E. Guthe first offered a course under this name. A course in electrochemistry was introduced by Carhart in 1902-3, and one entitled Advanced Electricity and Magnetism by Patterson in 1904-5. In 1907-8 instruction in the measurement of high temperatures was begun by Randall. Two courses in advanced physics were given by Guthe, beginning in 1910-11. These have since given way to separate intermediate courses in mechanics, sound, heat, and light. In the same year were announced a seminar and courses on electromagnetic theory by Guthe, on direct and alternating currents by Neil Hooker Williams (93c, Ph.D. '12), and on radiation by Randall. For ten years following Carhart's resignation the laboratory course in electrochemistry was carried on by William D. Henderson ('03, Ph.D. '06), who later became Director of the University Extension Service.

Courses in German and French reading for students of the sciences were first listed in the physics group in 1912-13. A course in X rays was first offered by

David Locke Webster (Harvard '10, Ph.D. *ibid.* '13) in 1917-18, and one on the theory of gases by Walter Francis Colby ('01, Ph.D. '09) in 1920-21. Work in modern physics was introduced by Colby in 1921-22, as was also the study of vacuum tubes by Williams. In 1923-24 appeared announcements of courses in quantum mechanics by Colby, on physical optics by William Warner Sleator ('09, Ph.D. '17), and on atomic structure by Ernest Franklin Barker; in 1924-25, geometrical optics by Ralph Alanson Sawyer (Dartmouth '15, Ph.D. Chicago '19), theoretical mechanics by Oskar B. Klein (Fil.Dr., Inst. for teor. Fysik [Copenhagen] '21), spectral series by Randall, X-ray equipment and apparatus by George Allan Lindsay ('05, Ph.D. '13), and electronics and conduction of electricity through gases by Ora Stanley Duffendack (Chicago '17, Ph.D. Princeton '22); in 1925-26, laboratory work in radioactivity by Arthur Whitmore Smith (Dartmouth '93, Ph.D. Johns Hopkins '03); in 1926-27, high-frequency measurements by Williams, architectural acoustics by Daniel Leslie Rich (Waynesburg '02, Ph.D. Michigan '15), and theory of spectra by Otto Laporte (Ph.D. Munich '24); in 1927-28, quantum mechanics by Laporte, theory of band spectra by David Mathias Dennison (Swarthmore '21, Ph.D. Michigan '24), infrared radiation by Randall, and contemporary physics by George Eugène Uhlenbeck (Ph.D. Leiden '27); in 1928-29 a proseminar for the master's degree and a year's work in molecular physics for graduate students not specializing in physics, and quantum theory and atomic structure by Dennison. In 1929-30 the theory of atomic spectra was introduced by Samuel Abraham Goudsmit (Ph.D. Leiden '27), and some eleven courses of special investigation were provided for graduate students with the idea of offering preliminary

investigation in any line to those not quite ready to begin a subject for the doctor's degree. In 1934-35 a non-technical course in general physics was introduced by Rich especially for students not intending to continue work in physics; in 1937, mechanics of fluids by Lindsay; in 1939, nuclear physics by Horace Richard Crane (California Inst. Technol. '30, Ph.D. *ibid.* '34); and in 1942, introduction to aerodynamics by Uhlenbeck. Since 1920 Charles Ferdinand Meyer (Johns Hopkins '06, Ph.D. *ibid.* '12) has had charge of the laboratory in physical optics.

The average numbers of courses listed each year during five-year intervals are given in Table I.

TABLE I

Interval	Number of Courses Offered
1901-6	23
1906-11	25
1911-16	34
1916-21	38
1921-26	40
1926-31	51
1931-36	64
1936-41	48

Nearly all of the courses which are now considered as advanced work for graduate students have been added since 1920. Among the few exceptions to this are courses in electricity and magnetism and in thermodynamics.

The inclusion of new courses in the curriculum follows rather closely the advance of research in any particular phase of the subject. For example, the great activity in research concerning the structure of the atom in the years about 1920 corresponds with the introduction of a course in atomic structure in 1923, and the development of new types of vacuum tubes and their application to radio communication were followed by a course in vacuum tubes in 1921. In general, there has been a great increase in

the amount of theoretical physics offered since 1920. The same period has witnessed a remarkable growth in the research productivity of the department. This growth was unquestionably favored by the unusual conditions in physics during these years, for so many new experimental results were obtained through such agencies as optical and X-ray spectra—in fact, through measurements of electromagnetic radiation, from the greatest wave length down to cosmic radiation at the other extreme of the spectrum—that there was almost unparalleled opportunity for new investigation. The policy of Karl E. Guthe, Director of the Physical Laboratory from 1911 until 1915, and of H. M. Randall since that time, was definitely to encourage research to the fullest extent. This encouragement by word, by example, and by every effort to provide the necessary apparatus for the problems undertaken has been a source of continual inspiration to the members of the staff. Fortunately, the new building (East Physics Building), erected in 1924, afforded more space and other facilities without which many of the investigations since successfully carried on would have been quite impossible. In this new structure, renamed the Harrison M. Randall Laboratory of Physics in 1940, are conducted the advanced classes as well as the research work. The offices of the permanent members of the staff are also located there. The elementary class and laboratory work is carried on in the older West Physics Building.

The number of graduate students in physics has increased rather steadily, and the increase has been rapid since 1925. Because of the different manner of publishing registers of students in different years, it is difficult to obtain complete and reliable figures on the total number specializing in the department for all the years. In Table II, which has been com-

piled from various tabulations, the net numbers of graduate students specializing in physics are given for every fifth year. Previous to 1890 the subject of specialization was not recorded in the registers. The record of the master's and doctor's degrees begins with 1891.

LABORATORIES.—Although the teaching of physics began in 1843, laboratory work was not started until the beginning of the second semester, February 18, 1878. The space then devoted exclusively

TABLE II

Year	Number of Graduate Students Specializing in Physics	Master's Degrees Granted	Doctor's Degrees Granted
1890-91	1	..	..
1895-96	4	2	..
1900-1901	6	2	..
1905-6	15	5	1
1910-11	28	2	1
1915-16	23	2	2
1920-21	27	7	..
1925-26	57*	10	7
1930-31	118*	15	7
1935-36	100	20	5
1940-41	101	21	8

* The numbers marked with an asterisk (*) are not net; they are the sums of the attendances for the academic year and summer school. The number of duplications in these years is not definitely obtainable; it would probably range from five to fifteen each year.

to the Department of Physics extended, as stated in the catalogues of the time, "in a direct line over 125 feet," was "well lighted from the north, east, and south," and "was provided with gas, steam, and water." This laboratory was in a suite of rooms on the top floor of University Hall adjacent to the office occupied by Professor C. K. Wead, who was then in charge of the instruction in physics.

A new \$30,000 physics laboratory, the first unit of what is now known as the West Physics Laboratory, was ready for

occupancy in October, 1888. The basement and the second story were occupied by physics and the third story by the laboratory of hygiene. On the completion of the then "new" Medical Building in 1903, the laboratory of hygiene was removed to new quarters, thus leaving much needed room for the development of physics (see VIII: WEST PHYSICS BUILDING).

In 1905 an addition, costing, with equipment, about \$45,000, was made. An important feature of this addition was a well-equipped lecture room (the West Lecture Room) accommodating four hundred students. The entire building is still used exclusively by the department. It houses a well-equipped shop employing five full-time instrument makers, a liquid-air plant with a capacity of four quarts per hour, a glass-blowing room in which two professional glass blowers work, a large lecture room, six apparatus rooms, a battery room, eight rooms for elementary laboratory work, six classrooms, and a few offices.

In 1920, two large rooms at the north end of the basement in Tappan Hall were taken over. One was used for spectrographic research, and the other served as a light laboratory. These continued to be occupied as physics laboratories for four years.

During 1923 and 1924 a new building, standing in part on the site occupied from 1850 to 1913 by the first Medical Building, was erected. This new structure, the East Physics Building, cost, exclusive of equipment, about \$450,000 and was ready for occupancy in February, 1924. It is an L-shaped building, the outside of the L being 144 feet by 132 feet and the wings 60 feet wide. There are four floors above ground, and a full-lighted basement; under about three-fourths of this basement is a subbasement, and under one-half of this subbasement is a sub-subbasement, making the building, in

part, seven stories high. The soil on which the structure stands is good building gravel to a depth of about 300 feet, and the water table is about 80 feet below the surface. This very favorable soil condition makes the lower basements not only dry but also exceptionally free from vibration. These lower rooms, well ventilated, well lighted artificially, and easily kept at a uniform temperature, have proved to be the rooms most in demand for research (see Part VIII: EAST PHYSICS BUILDING).

The building is of the skeleton-type construction, the reinforced concrete columns and floor slabs carrying the entire weight and providing almost the entire strength of the structure. This type of construction permits the interior walls and partitions to be of light, easily removable hollow tile. The floors were finished before these light partitions were erected, and the partitions themselves have been kept almost entirely free from permanent wiring and piping. The result is that rooms may easily be made larger or smaller by the removal or by the insertion of a wall. Experience has proven this type of construction to be a very wise one; in spite of careful planning, many changes in the locations of partitions have been found desirable. The skeleton columns were so spaced as to make the natural unit of construction twelve by twenty-four feet; that is, nearly all rooms are either of this size or of a small integral multiple of this size. A two-unit room is twenty-four feet square, a three-unit room, a third larger on one side.

Probably the most elaborate single item in the building is the electrical wiring. In addition to 110- and 220-volt D.C. and 110- and 220-volt three-phase A.C., the laboratory has three battery rooms and several motor generators. Each unit room, in addition to ordinary lighting and power service, is provided

with circuits which permit any of the available sources to be used. On the average about six individual circuits for experimental purposes are available in each unit room. The interconnecting of this electrical system requires over thirty separate plug- and switch-boards ranging in size from six square feet to eighty square feet each, and literally thousands of circuits. The electricians who wired the building made the remark that reinforcing steel might have been dispensed with, the concrete being sufficiently strengthened with electrical conduits.

Several other unusual features were incorporated, which permit flexibility and expansion of the various services supplying electricity, water, gas, steam, and compressed air; also special wood mounting strips and hundreds of threaded inserts were imbedded in the concrete walls and ceilings, to provide facilities for the rigid attachment of apparatus.

A four-unit, two-story room was provided for high-voltage research; also a separate two-story building on its own separate and very special foundation was provided, within the main building, for work in sound. This sound building contains two soundproof rooms and a large reverberation room, adjacent to other rooms planned for observation in sound. This sound building, a relatively heavy structure, is the most nearly free from vibration of any place in the Randall Laboratory. The lower walls and floors of the main building, because of the nature of the gravelly soil in which the building stands, are also nearly vibrationless; but, contrary to expectation, the special piers in the openings of the lowest basement floor are not so free from vibration as are the lower basement walls.

The East Physics Building is used mainly for advanced work. About 55 per cent of it is given over wholly to research. Advanced instructional laboratories occupy an additional 25 per cent, and the

remaining 20 per cent is taken up by offices, a library, and three classrooms. The elementary work has remained in the old West Physics Building.

According to present plans the East Physics Building will at some future time be extended toward the west and north and will thus, in conjunction with the structure now existing, form a U. Within this U would be two large lecture rooms, and north of these would be an instrument shop. Accordingly, the ground area which is occupied by the present building is less than one-half the area which the contemplated complete structure will occupy. With the realization of this development the West Physics Building would no longer be needed.

RESEARCH.—The extent of the contributions to the science of physics from the University of Michigan is indicated by a long list of papers and reports, some five hundred in all, originally published in various journals, but now available in collected form. They appear in the following two series:

University of Michigan Physical Laboratories, Papers. 1879-1910, 6 volumes.

Contributions from the Physical Laboratory of the University of Michigan. 1911-41, 6 volumes.

Some of these papers are concerned with problems in the teaching of physics, but the great majority deal with fundamental principles, either presenting significant experimental results, or discussing their interpretation, or both. A very few may be assigned to the category of applied physics, since they aim primarily at the utilization of scientific information rather than at the extension of knowledge. The relatively small proportion of such "practical" studies does not by any means signify that research in physics is of little value to the community, nor that the specialists in this field are insensitive

to the needs which their science might supply. It is, in fact, the result of a somewhat artificial classification which tends to transfer to the realm of engineering any development the aim of which is primarily utilitarian. A case in point is provided by the history of the dynamo-electric machinery laboratory. The principle of electromagnetic induction was discovered almost simultaneously by Joseph Henry and by Michael Faraday in the year 1831, but it remained a matter of "academic" interest until 1876, when the first practical generator was built. This machine was exhibited at the Centennial Exhibition in Philadelphia by its inventor, Mr. Charles Brush of Cleveland, a former Michigan student. For the first time in history it made possible the operation of an arc lamp without batteries. Professor Langley, after seeing the demonstration, returned to the laboratory here and constructed a dynamo of similar design but with some improvements and a larger output, so that three arc lamps could be operated at once. This early machine is still in the possession of the University. It constituted the beginning of a laboratory of dynamoelectric machinery, organized at first in the Department of Physics and later developed into the extensive laboratories of the Department of Electrical Engineering.

That type of research which aims at a more nearly complete understanding of natural laws, without concern for utilitarian or commercial values, is often called pure science. Investigations of this sort dealing with a very great variety of subjects have been included in the research program of the physics laboratory. Most of them may be listed in a rough classification (Table III).

By the end of the nineteenth century the so-called classical physics had assumed a fairly complete and consistent form, the last major developments having been in the field of electricity and

magnetism. In 1889 Henry S. Carhart wrote in his vice-presidential address before the American Association for the Advancement of Science:

Even popular interest in electricity is now well-nigh universal. Its applications increase with such prodigious rapidity that only experts can keep pace with them. At the same time the developments in pure electrical theory are such as to astound the intelligent layman and to inflame the imagination of the most profound philosopher.

Carhart was himself a profound scholar in this field, and his own researches, together with those of his associates, contributed greatly to its development. Of particular note was his series of studies (1899; 1903) on primary cells, revealing

TABLE III

	Published Reports
Mechanics, optics, sound, and heat..	70
Electricity and magnetism.....	95
Radiation and the structure of matter	375
Mathematical and theoretical developments.....	65

experimentally and explaining thermodynamically the relation of the electromotive force in a cell to the temperature and concentration as well as the chemical nature of the constituents. This led directly to the specifications for the famous Carhart-Clark standard cell, and for the legal standard volt. The legal standard unit for the measurement of electric current is the international ampere, which depends upon the electrochemical equivalent of silver. The value of this constant was measured with great precision by Guthe in 1905. These and similar fundamental researches attained international recognition and contributed materially to the high standard of accuracy which now characterizes electrical measurements. In subsequent years, however, the primary interest of the department turned to other fields, and contributions to electrical theory have been less sig-

nificant. An exception should be made, however, for the recent direct measurements by Neil H. Williams of the charge per electron transported by a current crossing a vacuum gap. Although the electron charge had previously been known, it was only through indirect measurements on ions. Williams' value, of course, agreed with that determined by Millikan in 1913 for the charge upon a monovalent ion. The observations upon electrons were later extended and corroborated by similar measurements upon metallic ions.

Researches in electrical conduction through metals, gases, and high vacua, which established the corpuscular nature of electrical charges, led directly to the problem of the fundamental nature of matter, i.e., the constitution of atoms, molecules, and crystals. Bohr's theory of atomic structure, first announced in 1913, supplied a tremendous stimulus to such investigations, indicating a new line of attack through spectroscopic observations. It is not surprising that during the last three decades the major interest, and in fact almost the exclusive research activity, of the department should have been devoted to this field. The first spectroscopic studies at Michigan, published in 1911 by Randall, dealt with the emission of infrared (low-frequency) radiations by metallic vapors and the reflection of infrared rays by crystals. His measurements began near the end of the visible spectrum and extended to wave lengths about four times as great. As glass becomes opaque in this region it is necessary to dispense with lenses and use only mirrors in the optical system.

The dispersion is effected by means of a diffraction grating ruled upon a polished metal surface. These infrared rays can be detected neither by the eye nor by a photographic plate, but only through their heating effect, which is extremely minute. The temperature

change resulting when they fall upon a sensitive thermopile gives rise to an electric current which is recorded by means of a galvanometer of high sensitivity. Randall brought the technique of these measurements from Tübingen, where he had been associated with one of the greatest of spectroscopists, Professor F. Paschen. No suitable apparatus being available on the market, it was necessary from the first to construct and adapt the equipment, including thermopiles, galvanometers, and mirrors. This development in measuring apparatus has been almost continuous in subsequent years, with vital contributions from all members of the group associated with this research, including Randall, Sleator, Barker, Meyer, Colby, Firestone, Hardy, Wright, and others.

In 1915 Sleator, working with Randall, set up a prism-grating spectrometer for the study of the molecular absorption of water vapor, the design of which has been frequently copied. The following year this instrument was used by Randall and Imes for their famous analysis of the absorption bands of hydrogen chloride. These studies mark the beginning of a long and continuous sequence of investigations upon the characteristic vibrational and rotational motions of various gaseous molecules, which have yielded much valuable information about the geometric form and actual dimensions of different molecules. Very important contributions in connection with the interpretation of the observed data have been made by Dennison and Colby.

In all, about one hundred and twenty papers dealing with spectroscopy of the infrared have been published, and this laboratory is generally recognized the world over as the principal center for such work. Major improvements in apparatus have been made from time to time, not only increasing precision and sensitivity, but also very greatly extend-

ing the range of wave lengths which may be studied. With an instrument completed by H. M. Randall in 1936, consisting of a large recording spectrometer completely enclosed in a case which may be evacuated, measurements are possible to wave lengths more than two hundred times those of red light, in fact, practically to the lower limit for radio waves.

A second important type of spectroscopic investigation deals with visible and ultraviolet radiations, both from atoms and from molecules. In these the records are photographic. R. A. Sawyer and O. S. Duffendack, with their associates, have been responsible for most of this work, which is represented by some ninety-five papers. The earliest of these appeared in 1921. Studies of the excitation of various spectral lines from different atoms and their classification are of great interest not only from the standpoint of atomic mechanics but also because they find applications in rather widely separated fields. Astronomy and astrophysics, for instance, depend very much upon spectroscopic information for their determinations of the temperature and other physical conditions in stars and nebulae. Such observations may also be utilized for chemical analysis in the quantitative determination of very small traces of different metals. Duffendack has pioneered in this type of work and also in studies of the critical potentials of atoms and molecules through controlled impacts. Sawyer is responsible for recent developments in precision spectrochemical analysis, particularly of ferrous metals, a contribution of very considerable importance from the industrial point of view. He has been concerned also with measurements in the extremely short-wave ultraviolet region, and with the determination and interpretation of hyperfine structure in spectral lines.

The study of X radiation yields intimate and characteristic information regarding the structure of atoms and their geometrical arrangement in crystals. In 1920, when this field was just beginning to be systematized, G. A. Lindsay adopted it as his special interest, emphasizing particularly the precise measurement and classification of absorption edges. His first report appeared in 1922. Very shortly thereafter J. M. Cork began a program of work in the same field, extending the systematic classification of atomic levels to some of the less well-known elements. Of particular interest in this connection was his work on element No. 61, one of the very last chemical elements to be discovered. Cork also made some of the earliest grating measurements of the wave lengths of X rays, showing an inconsistency in the previous crystal measurements, which demanded a slight increase in the accepted value of the electron charge. This result has since been abundantly confirmed.

The optical gratings, by means of which wave lengths are determined, consist of polished metal surfaces ruled with parallel and equidistant lines. The distances between successive lines must be greater than the wave length measured, but preferably not much greater. Even the finest gratings, having perhaps thirty or forty thousand lines per inch, are very coarse in comparison with X rays. For the far infrared, on the other hand, gratings with twenty-five to one hundred lines per inch are required. Effective work throughout the spectrum is possible only when a considerable selection of suitable gratings is available, and the Department of Physics is peculiarly fortunate in this respect, since it possesses an excellent ruling machine (one of perhaps half a dozen such machines in existence). The development work in connection with this mechanism and in the preparation and ruling of surfaces

has been largely under the direction of Barker, since his infrared investigations were among the first which required gratings not obtainable elsewhere.

Entirely different methods must usually be employed for measurements in the range of radio waves. An interesting recent development in Williams' laboratory, however, involves the production of radio waves less than half an inch in length and their measurement by means of gratings built up of narrow metal strips. The problem of producing such waves is one requiring much ingenuity, since tubes having almost microscopic dimensions must be constructed, and never before have grating measurements of this sort been attempted. These radiations are found to yield further information concerning the structure of certain molecules.

The most recent and perhaps the most spectacular experimental development in atomic physics sponsored by this department is an attack upon the problem of nuclear constitution through artificial disintegration of atoms and induced radioactivity. It was begun by Cork in 1934, when he constructed a Van de Graaff generator designed to develop a potential difference of one million volts. This instrument was replaced in 1936 by the million-volt transformer equipment planned and assembled by H. R. Crane and by the cyclotron, for which Randall and Cork were responsible. The latter apparatus has a magnet weighing ninety tons, with pole pieces thirty-six inches in diameter. It is capable of accelerating ions by means of successive impulses up to speeds corresponding to twelve million equivalent volts. This instrument has made possible the production of a great variety of radioactive atoms which do not occur in nature and which are useful as tools in many new types of investigation. It also supplies neutrons in very large

numbers. Researches in physics which are dependent upon the cyclotron include studies of nuclear energy levels, the production and measurement of gamma radiations, the upper limits of beta-ray energies, the scattering of neutrons, and the precise determination of atomic masses.

A very considerable portion of the output from the cyclotron is utilized in activities outside the Department of Physics. These include tracer chemistry, studies in plant and animal metabolism of the physiological effects of neutrons, and the treatment of certain diseases by radiotherapy.

During the decade 1915 to 1925 the accumulation of experimental data, particularly upon atomic problems, was so enormous and the necessary changes in point of view were so far-reaching that the department came to feel acutely the need for specialists in systematization and in interpretation. Throughout this period W. F. Colby had generously consulted and co-operated with various experimentalists, meanwhile carrying most of the responsibility for instruction in theoretical physics. In 1923 Dr. Oskar B. Klein was appointed to the staff and assigned courses in mechanics and quantum theory. His contributions, both in the classroom and in the seminar, were of great value during the three years of his residence in this country. Otto Laporte, who had already attained distinction in the field of complex atomic spectra, was appointed in 1926. His analysis and interpretation of the spectrum of iron are especially well known. In 1927 the department materially enlarged the group in theoretical physics by the addition of D. M. Dennison, S. A. Goudsmit, and G. E. Uhlenbeck.

Dennison has made contributions of the very first rank in the field of molecular mechanics, co-operating effectively in the studies of infrared radiation and

band spectra. Several of his papers are very well known, in particular his discussion of ortho- and para-hydrogen, and the prediction regarding their separation, and his masterly summary of the mechanical problem of molecular vibrations.

Goudsmit's field is also that of complex atomic spectra. Uhlenbeck and he were the first to introduce the concept of electron spin which is now an indispensable element in the solution of all spectroscopic problems. This idea and its implications have also been extended by Goudsmit to the realm of nuclear structure and the mutual interaction of elementary particles. Both Uhlenbeck and Laporte have made significant contributions to quantum mechanics and also to purely mathematical developments upon which it depends.

It has always been the policy of the Department of Physics to co-operate to the fullest extent with other departments and research units whenever this can be done to advantage. For example, the Department of Engineering Research, since its organization, has maintained an extensive program in physics and has occupied space in the Randall Laboratory. One member of the departmental staff is assigned to each research project as consultant. These projects originate with various industrial organizations and have included such problems as noise reduction in automobiles and other mechanisms, the development of devices for testing and inspecting bearing surfaces, the improvement of spark plugs and ignition apparatus, and the spectrum analysis of steel and of metallic alloys. Judged by the satisfaction of its clients, the staff has a high record of success in the field of applied physics. Floyd Alburn Firestone (Case '21, Ph.D. Michigan '31) was appointed in 1923 as the first research physicist under this program, but since 1926 has been a member of the regular staff. Most of his contributions

are in the field of acoustics, with particular emphasis upon industrial applications.

Another typical co-operative research has been carried on for some years with the assistance of the Medical School and a grant from the Rockefeller Foundation. This has developed, under Duffendack and Thompson, a spectroscopic procedure for the rapid quantitative analysis of body fluids for minute traces of various metallic constituents. Randall and Wright, also associated with this project, devised spectroscopic means for the detection by infrared measurements of several amino acids which are of great physiological importance.

A second association of physics and medicine has been developed, under a grant from the Rackham Fund, for the production and study of neutrons and artificially radioactive atoms and the determination of their physiological and therapeutic significance. The cyclotron and high-tension equipment are being utilized for these investigations.

The most recent addition to the departmental equipment is the electron microscope now being operated under Duffendack's supervision. It is an instrument of great promise and wide applicability, providing very much higher magnifications than are available by any other means. It is being applied in investigations on the structure of matter and also in the fields of bacteriology, biology, metallurgy, and engineering.

In any field of knowledge the University has two responsibilities: the discovery and interpretation of new truths and the conservation and transmission of existing information. Almost from the beginning of its scholarly activities the Department of Physics has developed both of these functions simultaneously. One of its very important scientific activities has been the production of textbooks of the first rank. The texts by

Carhart were particularly famous and were very widely used for many years.

The scientific standing which has been attained by the Department of Physics during the last two decades, its most active period, is due not simply to the individual eminence of various staff members, but arises in large measure from two other factors. One is the spirit of cordiality and co-operation which pervades the group, and the other, even more significant, is Randall's inspiring and sympathetic leadership, extending through almost the whole of this period.

THE INSTRUMENT SHOP.—A summary of the research activities in physics would not be complete without mention of the effective service rendered by the instrument shop. Its staff includes five trained instrument makers, under the supervision of Mr. Hermann Roemer, and a very skillful glass blower, Mr. Gunther Kessler. The shop not only supplies a service department, but also undertakes without hesitation and handles in the most competent way the construction of elaborate and delicate apparatus for all sorts of precision work. Of especial note is the ruling machine previously mentioned, which was designed and constructed here, and is now under the charge of Mr. Paul Weyrich, who also builds the sensitive thermopiles and makes the optical mirrors. Vacuum systems, gauges, and other apparatus of glass and quartz also are continually in demand.

THE SUMMER SYMPOSIA ON THEORETICAL PHYSICS.—The summer symposia had their rather modest beginnings in the summer of 1923. In that year two nonresident lecturers, Professor K. T. Compton, then of Princeton University, and Professor F. A. Saunders, of Harvard University, were invited to give courses in modern physics. The results of this innovation were sufficiently gratifying to warrant a continuation of the policy,

and during the next few years the following men were called as lecturers to the Department of Physics (the institutional connections given are those which they had at the time they lectured in the symposia at Ann Arbor):

- 1924 W. L. Bragg, University of Manchester, England
- 1925 P. D. Foote, Bureau of Standards
W. P. Davey, Research Laboratory of the General Electric Company
H. Fletcher, Research Laboratory of the American Telephone and Telegraph Company
- 1926 Dr. C. E. St. John, Mount Wilson Solar Observatory
K. F. Herzfeld, University of Munich, Germany
- 1927 E. A. Milne, University of Manchester, England

The year 1927 closed the first period of development of the physics symposia. When this period was reviewed, several points stood out clearly. The nonresident lecturers had been stimulating both to the graduate students and to the regular staff of the department. The influence of the lecturers, however, had been purely local in character; their presence had not attracted any great attention outside of the University. Moreover, those lecturers who were primarily theoretical physicists had been able to give more to their audiences than had the experimental physicists. This was probably caused by the difficulty of satisfactorily describing an experimental technique—it must be learned from actual experience—and by the fact that the principal advances then being made in physics were in the field of theoretical research.

In the summer of 1928 a series of special courses was offered in theoretical physics; these were supplemented by informal colloquia on the most recent developments of the subject. Professor H.

A. Kramers, then of the Rijks Universiteit, Utrecht, Holland, gave courses on wave mechanics. Professor E. C. Kemble, of Harvard University, lectured on band spectra. In addition to the non-resident lecturers, S. A. Goudsmit and G. E. Uhlenbeck, who had recently been called to the University of Michigan, gave courses on the quantum theory of spectra and on Einstein-Bose and Fermi-Dirac statistics, respectively.

The success of this first symposium on theoretical physics was unmistakable. Not only were many graduate students attracted to the University to attend the courses, but, better still, a considerable number of distinguished visitors came, who participated in the colloquia and held discussions with the lecturers. These visitors were men, all holders of doctor of philosophy degrees, who were themselves actively engaged in productive research. It was possible during the ensuing year to trace in a number of articles

in scientific journals ideas which had had their inception in the discussions of the symposium. The influence of this meeting was national and international rather than local.

The character of the summer symposia on theoretical physics was established by the symposium of the summer of 1928, and during the ensuing years it has only become more permanent and definitely determined. Each succeeding year has seen men of international reputation in physics come to Ann Arbor as lecturers; these men have played and are now playing the most prominent roles in the development of the subject. In addition to the nonresident lecturers, members of the regular physics staff have usually appeared on the programs. In Table IV are listed the symposium lecturers and their topics for the years 1929 to 1941. Except where explicitly stated otherwise, the courses ran for the full length of the session.

TABLE IV

1929	
P. A. M. Dirac, Cambridge University, England	Advanced Quantum Mechanics
E. A. Milne, Oxford University, England	Problems in Astrophysics
Leon Brillouin, University of Paris, France	Quantum Statistics
K. F. Herzfeld, Johns Hopkins University	Statistical Mechanics
Edward U. Condon, Princeton University	Introduction to Quantum Mechanics
D. M. Dennison, University of Michigan	Band Spectra
1930	
Paul S. Ehrenfest, University of Leiden, Holland	Problems in Modern and Classical Physics
Enrico Fermi, Royal University of Rome, Italy	Quantum Electrodynamics
Philip M. Morse, Princeton University	Quantum Mechanics (seven weeks)
S. A. Goudsmit, University of Michigan	Quantum Theory of Atomic Spectra
G. E. Uhlenbeck, University of Michigan	Applications of the Theory of Probability in Physics
1931	
Arnold Sommerfeld, University of Munich, Germany	Electron Theory of Metals (four weeks); Selected Problems of Wave Mechanics (four weeks)

TABLE IV (Cont.)

Wolfgang Pauli, University of Zurich, Switzerland.....	Problems of Nuclear Physics (four weeks); Application of Quantum Theory to Problems of Thermal Equilibrium (four weeks)
H. A. Kramers, University of Utrecht, Holland.....	Quantum Mechanics and Classical Models
J. R. Oppenheimer, California Institute of Technology.....	General Quantum Theory of Transitions (four weeks)
W. F. Colby, University of Michigan.....	Theory of Band Spectra
G. E. Uhlenbeck, University of Michigan.....	The Theory of Probability in Physics
Otto Laporte, University of Michigan.....	Quantum Theory of Atomic Spectra

1932

Werner Heisenberg, University of Leipzig, Germany.....	Selected Problems in Quantum Mechanics
Gregory Breit, New York University.....	The Quantum Theory of Radiation and Dispersion
S. A. Goudsmit, University of Michigan.....	Theory of Hyperfine Structure of Spectral Lines
D. M. Dennison, University of Michigan.....	Theory of Band Spectra

1933

Niels Bohr, University of Copenhagen, Denmark.....	The Foundations of Quantum Mechanics (two weeks)
Enrico Fermi, Royal University of Rome, Italy.....	Structure of the Atomic Nucleus
J. H. Van Vleck, University of Wisconsin.....	Recent Developments in the Theory of Magnetism
S. A. Goudsmit, University of Michigan.....	Structure of Atomic Spectra
G. E. Uhlenbeck, University of Michigan.....	Quantum Mechanics
D. M. Dennison, University of Michigan.....	Theory of Band Spectra

1934

George Gamow, Polytechnical Institute of Leningrad, Russia.....	The Atomic Nucleus
J. R. Oppenheimer, University of California.....	The Theory of the Positron (three weeks)
E. O. Lawrence, University of California.....	Artificial Disintegration of Atomic Nuclei (four weeks)
Thomas H. Johnson, Bartol Research Foundation.....	Cosmic Rays (two weeks)
Arthur H. Compton, University of Chicago.....	Cosmic Rays (three lectures)
G. E. Uhlenbeck, University of Michigan.....	The Dirac Theory of the Electron (four weeks)
D. M. Dennison, University of Michigan.....	Introduction to Quantum Mechanics

1935

Enrico Fermi, Royal University of Rome, Italy.....	Selected Subjects in Quantum Mechanics
Felix Bloch, Stanford University.....	The Quantum Theory of the Metallic State (four weeks)
S. A. Goudsmit, University of Michigan.....	Theory of Atomic Structure
G. E. Uhlenbeck, University of Michigan.....	Advanced Quantum Mechanics (four weeks)

1936

P. P. Ewald, Technische Hochschule, Stuttgart, Germany.....	The Theory of the Solid State
E. O. Lawrence, University of California.....	The Design and Technique of Cyclotrons (four weeks)
H. A. Bethe, Cornell University.....	The Physics of High Speed Particles (four weeks)
Edward U. Condon, Princeton University.....	The Quantum Mechanical Treatment of Selected Problems (six weeks)

TABLE IV (Cont.)

Gregory Breit, University of Wisconsin.....	Special Topics in Nuclear Theory (two weeks)
I. Rabi, Columbia University.....	Nuclear Moments (two weeks)
D. M. Dennison, University of Michigan.....	Theory of Band Spectra
Otto Laporte, University of Michigan.....	Structure of Atomic Spectra

1937

Enrico Fermi, Royal University of Rome, Italy.....	Theory of Beta Disintegration (three weeks)
G. E. Uhlenbeck, University of Utrecht, Holland.....	Nuclear Structure
James Franck, Johns Hopkins University.....	Photochemistry and Photosynthesis (one week)
L. H. Thomas, Ohio State University.....	Numerical Solution of Wave Functions (two weeks)
F. N. D. Kurie, University of California.....	Beta and Gamma Radiation (six weeks)
Kasimir Fajans, University of Michigan.....	Chemical Forces and Atomic Structure (three weeks)

1938

H. A. Kramers, University of Leiden, Holland.....	Relativity and Spin; Radiation Theory
P. P. Ewald, Cambridge University, England.....	X Rays and Crystal Structure (one week)
Gregory Breit, University of Wisconsin.....	Nuclear Forces (four weeks)
H. A. Bethe, Cornell University.....	Nuclear Physics (three weeks)
E. B. Wilson, Harvard University.....	Infrared and Raman Spectra (two weeks)
F. Seitz, General Electric Company.....	Theory of the Solid State (two weeks)

1939

Enrico Fermi, Columbia University.....	Cosmic Rays
E. J. Williams, University of Wales.....	Scattering of Cosmic Ray Particles (five weeks)
G. Herzberg, University of Saskatchewan.....	Band Spectra
J. A. Wheeler, Princeton University.....	The Interaction Between Radiation and the Nucleus (six weeks)
G. B. B. M. Sutherland, Cambridge University, England.....	Infrared Spectra (two weeks)

1940

E. P. Wigner, Princeton University.....	Theory of the Atomic Nucleus
R. Serber, University of Illinois.....	Theory of the Meson (two weeks)
W. H. Furry, Harvard University.....	Theory of Radiation (two weeks)
F. W. London, Duke University.....	Low Temperature Physics (three weeks)
B. Rossi, University of Chicago.....	Cosmic Rays (two weeks)
D. M. Dennison, University of Michigan.....	Band Spectra
G. E. Uhlenbeck, University of Michigan.....	Theoretical Aspects of Cosmic Rays

1941

Wolfgang Pauli, Princeton University.....	Recent Field Theories
F. Seitz, University of Pennsylvania.....	Theory of Solids (five weeks)
J. Schwinger, University of California.....	Nuclear Forces (four weeks)
V. F. Weisskopf, University of Rochester.....	Nuclear Reactions (two weeks)

As has already been mentioned, the summer symposia at Michigan have exerted an influence on physics which is both national and international in its scope. The distinguished guests have contributed much to the discussions and

colloquia. These men have come from the important centers of physics in the United States and abroad. In Table V are listed the numbers of students and guests attending within a sequence of typical years.

The role which the symposia have played in the development of the Department of Physics has been of very real importance. The meetings have been

upon the number of graduate students in the department enrolled during the summer session is indicated in the foregoing table, although it must be remembered that these years also coincide with a period of rapid expansion of the Department of Physics, and it would be difficult to distinguish between the two effects. In addition to the increase in the number of graduate students, there has been a marked advance in the quality and degree of ability of the students, which may be largely attributed to the symposia.

TABLE V

Year	Graduate Students	Guests
1928	43	18
1929	59	40
1930	51	25
1931	80	35
1932	79	29
1933	57	47
1934	62	39

an inspiration to the members of the regular staff as well as a direct practical aid in furthering many research programs. The influence of the symposia

CHARLES F. MEYER
GEORGE A. LINDSAY
DANIEL L. RICH
ERNEST F. BARKER
DAVID M. DENNISON

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THE DEPARTMENT OF POLITICAL SCIENCE

THE Department of Political Science was formally established at the University of Michigan in 1910. At the February meeting of that year, the Regents authorized Acting President Hutchins to make an investigation and report to the Board for appointment a professor of political science, "this chair to be regarded as part of the Department of Literature, Science, and the Arts" (*R.P.*, 1906-10, p. 660). At the April meeting, the election of a professor of political science was made upon Dr. Hutchins' recommendation. Jesse Suddall Reeves (Amherst '91, L.H.D. hon. *ibid.* '26, Ph.D. Johns Hopkins '94, LL.D. Williams '33), then an assistant professor of political science at Dartmouth College, was so chosen and entered upon his duties in September, 1910.

Instruction in the field which has come to be set apart as the Department of Political Science seems to have been begun in 1860, when the Regents voted as follows:

Resolved, That the resident Law Professor be required during the vacation of the Law Department to deliver before the Senior Class of the Academical Department a Course of Lectures on Constitutional Law and History and that he receive therefore an additional salary of \$500 *per annum*. (*R.P.*, 1837-64, p. 907.)

That this resolution was adopted in 1860 is significant. It was a time when the great American constitutional crisis impended, and the Regents recognized the duty of a state educational institution to inform its students on the constitutional system under which they were living. The resident professor of law was Thomas McIntyre Cooley, then just beginning his long and invaluable services to the

University. It was fortunate that such a man could be called upon. It may be surmised that it was in these lectures, given to the senior class of the Department of Literature, Science, and the Arts, that Judge Cooley began that exposition of the Constitution the influence of which came in time to extend far beyond the confines of the University in his classical works, *Constitutional Law* and *Constitutional Limitations*. The coming of the Civil War seriously reduced the attendance at the University. The students were in the field, engaged in maintaining the theory of the Constitution which they might have had from Cooley had they remained in college. The lectures seem to have continued until 1865, when, by action of the Board, Professor Cooley was "excused from his present duties connected with the Literary Department" (*R.P.*, 1864-70, p. 80).

When next the curriculum provided for instruction in the field of government, it was under the auspices of the Department of History, and there it remained, for the most part, until 1910. This was a natural arrangement at the time. Except at Columbia University, where a school of political science was founded in 1880 under Professor John W. Burgess, the study of political science was centered about the history of political institutions, and even at Columbia the influence of the historical school was strong. At Johns Hopkins, Professor Herbert B. Adams refused to make a distinction between history and political science. Upon the wall of his seminar room appeared in large letters the words of Freeman: "History is past politics and politics present history"—a half-truth which he took as his motto. The teaching of history at

the University of Michigan, as elsewhere, was largely political, and the meaning of institutions was sought in their origin and development.

In 1868-69 Charles Kendall Adams ('61, A.M. '62, LL.D. Harvard '86) offered in the Department of History lecture courses entitled the Growth of Liberty in England and the History and Characteristics of the Constitution of the United States (see Part IV: DEPARTMENT OF HISTORY). It was the abiding interest and activity of three men—President Angell, Thomas M. Cooley, and C. K. Adams, that led to the development here of studies in political science, although for a long time that generic term was not used. With the coming of President Angell (see Part I: ANGELL ADMINISTRATION), there was added to the curriculum Public International Law, a course available to the students of the Department of Law as well as to those in the Department of Literature, Science, and the Arts. From 1872 until 1910, except when he was absent from the University as Minister to China and as Minister to Turkey, President Angell gave this course in international law, which was soon supplemented by another course, the History of Treaties. The development of the Department of History under Charles Kendall Adams provided for additional courses—Political Institutions, English and American Constitutional History, and Comparative European Government. During Angell's absence as Minister to China in 1880 and 1881, International Law was given by Herbert Tuttle, who was designated Lecturer in International Law. Tuttle had been a student under Angell at Vermont, and this was his first academic appointment. With Angell's return, Tuttle gave lectures in history at the University of Michigan for another year, when he was called to Cornell University by Andrew D. White. There he had a brilliant

career as a professor of modern history, until his death in 1894.

During Angell's absence in China, there was organized a School of Political Science within the Department of Literature, Science, and the Arts, with Charles Kendall Adams as Dean in charge. As announced in the University *Calendar*, "the aim of the School is to afford exceptional opportunities for students interested in public questions to specialize in History, Political Economy, International Law, and kindred subjects under guidance of their instructors." The students were required to complete two years in the University before being eligible for admission to the School. The work of the School of Political Science was organized within the Department of Literature, Science, and the Arts, but was not limited to the undergraduate years. Although the Graduate School was not organized until 1892 and graduate studies were then integrated within the Department of Literature, Science, and the Arts, the plan of the School of Political Science extended through to the doctorate of philosophy:

Besides the regular examinations at the close of the semesters, every candidate for a degree was required to present and defend a thesis before a Committee of the Faculty, as well as to pass a satisfactory examination in three branches of study, a major and two minors. The student who met all the requirements would be recommended for the degree of Doctor of Philosophy. (Hinsdale, p. 85.)

The curriculum of the School of Political Science brought together the courses offered by Adams in American, British, and Continental European governments, Cooley's Taxation and the Growth of Cities, and Angell's International Law and Diplomacy, to which were added courses in political economy, social science, sanitary science, and forestry administration. Cooley added to the curriculum in 1883-84 a course on compara-

tive administrative law, with special reference to local government.

It is probable that the example set by Columbia University in organizing a school of political science was in the minds of Cooley, Frieze, and Adams when they undertook to organize the School of Political Science at the University of Michigan, although it was an awkward arrangement. A School of Political Science, with a dean, established within the Department of Literature, Science, and the Arts, gave rise to many difficulties of administration and control, especially as the teaching personnel of the School continued to give instruction in various fields outside of the School of Political Science. Notwithstanding the administrative difficulties, an increasing number of literary students was enrolled in the School, and the curriculum, with minor changes, continued to be announced annually through 1887-88. The *University Calendar* for 1888-89 noted: "It has been found unnecessary to retain an independent School of Political Science, under the form of organization described in calendars of previous years," and afterward the announcement of the curriculum of the School of Political Science disappeared from the *Calendar*. There is no record that the School was ever formally abolished by action of the Regents.

There were, however, in addition to the administrative difficulties, other reasons for the discontinuance of the School of Political Science. Charles Kendall Adams resigned to accept the presidency of Cornell in 1885 and was succeeded as Dean by Thomas McIntyre Cooley (LL.D. '73, LL.D. Harvard '86). The latter, however, was soon to interrupt his University activities in order to become chairman of the Interstate Commerce Commission upon its establishment in 1887. Apparently there were no men upon the faculty who were disposed

to undertake the burden of carrying on the School. In addition, the so-called university system, which was first announced in the *Calendar* for 1882-83, provided a method by which specialized instruction in the field of political science could be carried on without the special organization of a school. The university system was, in effect, an undergraduate concentration system upon an honors basis but closely integrated with postgraduate work in the Department of Literature, Science, and the Arts. The system was continued actively until the early nineties and nominally until 1901, and the name was later used only to describe graduate programs in general (see Part III: UNIVERSITY SYSTEM).

Under the leadership of Adams and Cooley, the University of Michigan School of Political Science attracted considerable attention both in the United States and in Europe, and during those years the University shared with Columbia and Johns Hopkins pre-eminence among the universities of the United States for training in political science. One outcome of the activities of the School was the organization of the Michigan Political Science Association, which for a number of years brought together from the state, outside of the University, men and women interested in political science. Its proceedings were published, and, under its auspices, a series of monographs was published, some of them of enduring value.

With the virtual disappearance of the university system the curricular development of subjects in political science was again taken over by the Department of History. In 1900 John Archibald Fairlie (Harvard '95, Ph.D. Columbia '98) was appointed Assistant Professor of Administrative Law and gave courses in the Department of History. That department now listed its courses as divided between those in history and those in gov-

ernment. In the latter group were the courses by Andrew Cunningham McLaughlin ('82, '85, LL.D. '12), in succession to Thomas M. Cooley, American Constitutional Law and Political Institutions, and by Fairlie, Comparative Administrative Law and Municipal Administration. Graduate research courses in the same fields were given by these men. Since 1891 McLaughlin had been teaching Constitutional Law and Political History of the United States, and Richard Hudson ('71, A.M. '77, LL.D. Nashville '01), a course called Comparative Constitutional Law. In 1896-97 Hudson offered a new course known as Municipal Government in Great Britain in the first semester and Municipal Government in Continental Europe during the second. McLaughlin left in 1903 to become director of the Bureau of Historical Research in the Carnegie Institution in Washington.

In 1903-4 Professor Fairlie offered a course known as the Government and Administration of Michigan. His interest thus shown bore valuable fruit in the services which he rendered as a member of the state constitutional convention of 1907, which drafted the present constitution of this state. Fairlie resigned at the close of 1908-9, to become a professor of political science at the University of Illinois. His subsequent career has been distinguished by continued scholarly productivity and by his election to the presidency of the American Political Science Association. Upon Fairlie's resignation, William L. Bailey was appointed Acting Assistant Professor of Administrative Law for the year 1909-10, an appointment which he declined, having accepted a permanent position at the University of Wisconsin. Thereupon Blaine F. Moore (Kansas '01, Ph.D. Columbia '09) was appointed Instructor in Political Science for 1909-10, continuing the courses formerly given by Fairlie.

With the year 1909 the long and memorable administration of President Angell ceased, and with it were discontinued the courses in international law and diplomacy which he had given for so many years. Continuance of instruction in these allied fields required the selection of a new man to give Dr. Angell's courses and also to relieve the Department of History from the burden of instruction in the field of government by providing for a professorship of political science, to which might be allocated as many of these courses as possible—the idea being to expand the work by the creation of a department of political science as rapidly as the needs warranted. Reeves was appointed to the new professorship, as has been stated. His courses in 1910-11 were American Government (federal, state, and local), Municipal Government, Public International Law, and History of American Diplomacy, together with a seminar in the history of political theory. The total elections for the year were about two hundred and fifty. American Government, intended as the foundation course for all undergraduate work in political science, soon proved popular, and expansion of the teaching staff was indicated. Benjamin Bruce Wallace (Macalester Coll. '02, Ph.D. Wisconsin '12), of the University of Wisconsin, served as Instructor in Political Science for the academic year 1911-12 and was succeeded in the instructorship by Joseph Ralston Hayden (Knox '10, Ph.D. Michigan '15), then an assistant in history. The curriculum was enlarged by Hayden's courses known as British Government and Administration and Comparative European Government. Hayden has been a member of the staff since the autumn of 1912. In 1918, returning to the University after active service in the United States Navy, he was appointed to an assistant professorship, and his promotion to a full

professorship was made in 1925. Soon after his return from service in the World War, he became especially interested in the administration of the Philippines and made several visits to the Islands for purposes of study and investigation. He was there throughout the year of his sabbatical leave, 1930-31, and from November, 1933, until February, 1936, again upon leave of absence from the University, he served as Vice-Governor of the Philippines. Since 1937, when Reeves retired from the departmental chairmanship while retaining the William W. Cook professorship, Hayden has been Chairman of the Department of Political Science.

As the years passed, a marked increase of interest in the field of municipal administration was clearly shown. This was partly owing to the provision in the Michigan constitution, introduced upon John A. Fairlie's insistence, for a system of home rule for cities in Michigan. In 1913 Robert Treat Crane (Johns Hopkins '02, Ph.D. *ibid.* '07, LL.B. Maryland '07), who had spent some years in the United States Foreign Service, was called to the University as Assistant Professor of Political Science and was given charge of the work in municipal administration. Under his direction, a curriculum leading to the special degree of master of arts in municipal administration was worked out and the Bureau of Government was established as a laboratory for the work in municipal administration (see Part VI: BUREAU OF GOVERNMENT). The direction of this work under Professor Crane was markedly successful, and men trained under him quickly found positions as city managers and administrative officers in the state of Michigan and elsewhere. In 1922 he expressed a desire to be relieved of the teaching of municipal administration, in order that he might devote himself to his primary interest, namely, political

theory. Accordingly, Thomas Harrison Reed (Harvard '01, LL.B. *ibid.* '04), who was then at the University of California, was appointed Professor of Political Science. He succeeded Crane as Director of the Bureau of Government in 1923 and continued in charge of the work in municipal administration until 1936, when he resigned to become the head of the Municipal Consultant Service of the National Municipal League. Crane offered a group of courses in political theory from 1922 until his resignation in 1932. At that time he became secretary of the Social Science Research Council. In 1922 James Hart (Virginia '18, Ph.D. Johns Hopkins '23), of the Johns Hopkins University, was called as an assistant professor in order to strengthen the work in American government. In 1926 Hart returned to Johns Hopkins, leaving there in 1935 to accept a professorship in the University of Virginia.

Others who have been upon the staff of the department as instructors are Messrs. Robert P. Lane, 1915-17; Hessel E. Yntema, 1918-20; Walter M. Dunn, 1921-23; John E. Kirkpatrick, 1921-24; William M. Strachan, 1923-27; W. Roland Maddox, 1927-31; John J. George, 1927-28; Robert Phillips, 1928-29; H. Arthur Steiner, 1920-31; Earl E. Warner, 1930-31; and Floyd E. McCaffree, 1931-37.

After the World War the registration in the introductory course, American Government, continued to increase until more than six hundred were enrolled. For some time it was a lecture course with quiz sections, but when the class became too large to be accommodated in any of the lecture rooms of the University, it was broken into several sections and the instruction was given by various members of the department. Since 1930 the course has been open to freshmen, and a more advanced course in the same field has been provided for upperclass-

men. The enrollment in these courses in American government at the present time is about eight hundred each semester.

A steadily increasing interest in government has resulted everywhere in a great expansion in the number of political science courses, especially in political theory, in comparative government, in administration and administrative law, in colonial administration, and in foreign relations. At the University of Michigan, the Department of Political Science has responded to the demand with a consequent increase in the number of courses offered and in the teaching personnel. The department has been enlarged by the appointment of assistant professors to give the instruction which the increased enrollment and expanding interest in political science have from time to time required. Everett Somerville Brown (B.L. California '07, Ph.D. *ibid.* '17) came to the department in 1921 and was advanced to a full professorship ten years later. For the most part, Brown has been in charge of instruction in the field of American federal government. Paul Miller Cuncannon (Swarthmore '15, Ph.D. Princeton '25), appointed Instructor in Political Science in 1923 and promoted to an assistant professorship in 1929, has given courses primarily in American government; and James Kerr Pollock, Jr. ('20, Ph.D. Harvard '25), who came to the University of Michigan from Ohio State University as an instructor in 1925 and was appointed to a full professorship in 1934, has developed the studies dealing with political parties and with European governments. Arthur Watson Bromage (Wesleyan '25, Ph.D. Harvard '28) came to an instructorship in political science in February, 1928, when Reed was granted a leave of absence. Bromage, whose work has been in the field of municipal and local government and administration, received his

promotion to a full professorship in 1938. Howard Black Calderwood, Jr. (Ohio Wesleyan '21, Ph.D. Wisconsin '27), was appointed as an instructor in 1927 and was promoted in 1936 to an assistant professorship. He has specialized in the field of international relations. After serving for two years as an assistant, Lawrence Preuss ('27, Ph.D. '32) became an instructor in 1928 and was promoted to an associate professorship in 1937. He gives instruction largely in international law, political theory, and comparative government. Harold M. Dorr ('23, Ph.D. '33), appointed as an instructor in 1929 and promoted to an associate professorship in 1939, has been primarily engaged in instruction in American government. Harlow James Heneman (Minnesota '28, Ph.D. London '34), appointed an instructor in 1933 and an associate professor in 1940, has given much of the work in British and European governments. During the period 1910-37 Reeves was Chairman of the Department of Political Science. In 1931 he was appointed William W. Cook Professor of American Institutions. As the departmental personnel increased, he relinquished the work in American government to others and became primarily interested in the field of international law and American foreign relations.

During the academic year 1935-36, in fourteen courses open to undergraduates only and providing for forty-six semester hours, there were 1,928 elections; and in nineteen courses open to both graduates and undergraduates and providing fifty-five semester hours, there were 1,732 undergraduate and 136 graduate elections; sixteen courses, primarily seminars, with forty-four semester hours, were open to graduate students only, and in these there were 200 elections—the total number of elections for the year being 2,996. Since that time there has been a considerable increase in graduate en-

rollment. Response to the demand for undergraduate instruction in political science in the expanded collegiate curriculum has, however, necessitated preponderant attention by the department to undergraduate instruction, as is shown by the foregoing figures; graduate instruction, however, has not been neglected since the seminar in political theory was instituted in 1910.

The department has not recommended a large number of candidates for the degree of doctor of philosophy. Those who have taken this degree, however, since the department was instituted, have by their subsequent careers abundantly justified themselves. Three are now members of the department—Professor Hayden and Associate Professors Preuss and Dorr. Hessel E. Yntema (Hope '12,

Ph.D. Michigan '19, S.J.D. Harvard '21), who has served as a professor in the Columbia Law School and at the Johns Hopkins University, later returned to the University of Michigan, where he is Professor of Law. Edwin B. Schultz is teaching political science at Lehigh University, John J. George at Rutgers, Roland M. Egger at the University of Virginia, William M. Strachan at Ohio Wesleyan University, Robert Phillips at Purdue, and Maximo M. Kalaw, Bernabe Africa, and Maria Lanzas-Carpio are professors at the University of the Philippines. Another recipient of the doctor's degree in political science, now deceased, was Howard MacDonald, late president of Parsons College, Iowa.

JESSE S. REEVES*

*Died July 7, 1942.

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THE DEPARTMENT OF PSYCHOLOGY

THE history of the Department of Psychology merges with that of the Department of Philosophy, since the two were not separated officially until 1929 (see Part IV: DEPARTMENT OF PHILOSOPHY).

In Europe psychology did not begin to be recognized as a separate subject until the period 1872-80, and in America there was no modern psychology until the middle of the eighties or the beginning of

the nineties. The work in psychology was given usually as "mental philosophy" by the professor of philosophy.

Two men in the early period may be mentioned because of their interest in psychology. Henry Philip Tappan (Union '25, D.D. *ibid.* '45, LL.D. Columbia '54), President of the University and Professor of Mental Philosophy from 1852 to 1863, wrote a book on the will. This work, supporting the doctrine of

free will as against determinism, was in certain respects a psychological contribution. Of the early holders of the chair of philosophy, he was probably the strongest man in his subject.

His successor, Erastus Otis Haven (Wesleyan '42, A.M. *ibid.* '45, D.D. hon. Union '54, LL.D. Ohio Wesleyan '63), a professor of philosophy as well as of other subjects, was not so able a man as Tappan, but he did write a textbook on mental philosophy which had wide use as a text in other institutions as well as at the University of Michigan.

The work in psychology proper began when John Dewey (Vermont '79, Ph.D. Johns Hopkins '84, LL.D. Michigan '04) came to the University in 1884. He was Instructor and Assistant Professor of Philosophy at the University of Michigan from 1884 to 1888. Then after a year as Professor of Philosophy at the University of Minnesota, he returned to Michigan in 1889 to become head of the Department of Philosophy, and continued in that capacity until 1894, when he left for a similar position at the University of Chicago.

Both philosophy and psychology prospered markedly under Dewey's influence. Of course he has always been primarily a philosopher, but his contributions to psychology are also noteworthy. His first book, *Psychology* (1886), was written under the influence of the Hegelian system; nevertheless, it shows some indications of the work that he was to do later. Dewey taught psychology at times, and he also encouraged the founding of the first psychological laboratory at the University.

The first course that might be regarded from its title as distinctly a modern psychology course was given in 1890 by James Hayden Tufts (Amherst '84, LL.D. *ibid.* '04, B.D. Yale '89, Ph.D. Freiburg '92), who came as Instructor in Philosophy in 1889. This course, in which

experimental work was offered, was entitled Physiological Psychology and was the first laboratory course in psychology at the University. Tufts resigned in 1891 and after a year abroad became an assistant professor of philosophy at the University of Chicago, where he was again associated with Dewey from 1894 to 1904 and later headed the philosophy department for many years. In 1891 George Herbert Mead (A.B. Oberlin '83, A.B. Harvard '88) took over the course and added to it a certain amount of experimental work. He was Instructor in Philosophy from 1891 to 1893 and Assistant Professor in 1893-94; then, with Dewey, he also went to Chicago. There he advanced to a full professorship and remained in the philosophy department, of which he was the chairman in his later years, succeeding Tufts.

Mead offered four courses in various phases of physiological and experimental psychology in the early nineties. He changed the title of the course in physiological psychology to Advanced Psychology in 1893-94. He had taken over the two courses in experimental psychology, and continued them during the two years. He also, in 1893-94, offered a research course, which was apparently experimental psychology.

Neither Tufts nor Mead had had special training in laboratory psychology or physiological or experimental psychology, but their later work showed them to be men of the greatest ability. At this distance it is hard to say exactly what the content of their course was, although, to judge from the textbooks used, it was obviously a traditional course, treated from the viewpoint of physiological rather than of experimental psychology. The tradition that still held in 1897 was that Mead had started a fire in the South Wing of University Hall, where the laboratory was at that time, by permitting a brain that was being prepared and

shellacked to catch fire; the fire then extended to the partitions of the laboratory proper.

During this early period a keen interest in psychology was evidently aroused among the undergraduates, to judge from the presence of students who later did work of importance in psychology. Thaddeus L. Bolton ('89, Ph.D. Clark '95) was a professor in various universities; later, from 1917 until he retired, he was in charge of the work in psychology at Temple University in Philadelphia. In 1891 James Rowland Angell received a master's degree, having taken his bachelor's degree in 1890. His interest in psychology developed, of course, under the influence of Dewey and Tufts. Immediately after receiving a second master's degree from Harvard in 1892, he, like Dewey, spent a year in the philosophy department of the University of Minnesota and then was called to the University of Chicago, where he was appointed director of the psychological laboratory in 1894. The careers of these two men may be regarded as ample evidence that outstanding students came under the influence of Dewey and his colleagues during the period when he was in charge of the work in psychology at the University of Michigan.

When Dewey left, the work in psychology became more definitely subordinated to the work in philosophy. Alfred Henry Lloyd (Harvard '86, Ph.D. *ibid.* '93), long connected with the Department of Philosophy, was elected Acting Chairman, and he and his followers gave the general courses in psychology. For one year, 1894-95, John Bigham (Amherst '87, B.D. Yale '92, Ph.D. Harvard '94), who had studied under Münsterberg, was Instructor. He came specifically to do work in psychology, although his title was Instructor in Philosophy. Apparently a man of the mechanically minded type, he was fairly successful with

the laboratory, for which, in his one year at the University, he gathered together a supply of apparatus rather unusual at that time. At the end of the year he went into business.

His successor, Edgar Pierce (Harvard '92, Ph.D. *ibid.* '95), had also studied under Münsterberg. Primarily, he carried on the laboratory work, at which, according to Professor Lloyd, he was very successful. However, he too left at the end of the year. He married the daughter of the proprietor of a chain of fashionable hotels in Boston. Pierce took an active part in the management of the hotels and abandoned work in psychology, but not, apparently, his interest in the subject. He continued to be a member of the American Psychological Association.

In the year 1896-97 Robert Mark Wenley (A.M. Glasgow '84, Ph.D. *ibid.* '95, LL.D. *ibid.* '01, Sc.D. Edinburgh '91) was appointed Professor of Philosophy and head of the Department of Philosophy. He decided not to fill the instructorship in psychology until after further consideration; so the place was left vacant, the laboratory equipment was stored, and the psychological work had a year's vacation.

In 1897-98 Walter Bowers Pillsbury (Nebraska '92, LL.D. *ibid.* '34, Ph.D. Cornell '96) was appointed Instructor in Psychology and revived the laboratory on a small scale. In the earlier years, the psychological laboratory ordinarily occupied a single unit on the first floor of the South Wing of University Hall. In 1897-98, a room on the first floor of the building now called Mason Hall was set aside for psychology. Although the room was small, it was divided into four smaller rooms, one of which was a general laboratory. Another was a small darkroom, and two other smaller rooms were available for purposes of research.

Up to that time the elementary course in psychology had ordinarily been given

by one of the members of the staff of the Department of Philosophy. The introductory course in philosophy in 1897-98 was given by Wenley. The first half of the course covered work in general philosophy, and in the middle of the semester the class was divided into two sections, one of which studied psychology and the other logic. Pillsbury was in charge of the psychology section in that year; and from that time on the work in psychology was entirely distinct from the work in philosophy as far as personnel was concerned. All the courses in psychology were given by Pillsbury and his assistants; philosophy proper was taught by others on the staff of the department. This arrangement continued until the required courses in the Department (later, College) of Literature, Science, and the Arts were discontinued. When the elective system went into effect, the original Course 1 in philosophy, which was made up of general philosophy and psychology or general philosophy and logic, was abandoned, and separate elective courses replaced it. In 1901 the words "Director of the Psychological Laboratory" were added to Pillsbury's title, in recognition of the separateness of the two disciplines.

From 1897-98 through 1900-1901 Psychology was a year course of three, four, or five hours each semester. There was an option of one or two hours of laboratory work in addition to the three hours of basic lectures and recitations. The maximum five-hour course was regarded as the normal one, however, and a full year's work was required to cover the subject. Professor Allen S. Whitney, of the Department of Education, suggested that the students of education needed a shorter course, and in the second semester of 1900-1901 a course of two hours complete in one semester was introduced specifically for their benefit. The latter course was afterwards extended to a one-semester course of three

hours offered twice a year to all students of the University. Although the original year course was continued, the newer course quickly became the more popular. Both are still offered, the longer one for students who wish a thorough survey of the subject in one course, and the other for those who need only a brief introduction, to be followed later by other courses in education or in psychology.

Of the several assistants in the early period who did not remain, perhaps the most important man was John Edward Wallace Wallin (Augustana '97, Ph.D. Yale '01), since become a specialist in educational psychology and mental hygiene and now in charge of the Division of Special Education of the State Department of Public Instruction of Delaware.

In 1903 John Frederick Shepard (St. Lawrence '01, Sc.D. *ibid.* '25, Ph.D. Michigan '06), then a student at the University of Chicago, came as an assistant and has continued with various titles to the present time. With the growth of the number of students and of the University resources, the staff gradually expanded. Shepard was appointed Instructor in 1906; he became Professor of Psychology in 1918. He specially developed animal psychology.

In 1910-11 Pillsbury received his promotion to a full professorship. The only other staff members in psychology at that time were Shepard and one assistant, Harry W. Crane.

The next addition to the staff was Henry Foster Adams (Wesleyan '05, Ph.D. Chicago '10), who, after a year at the University of Kansas, came to Michigan as Instructor in 1911. He now holds a professorship. He early began to specialize in advertising, and extended his interest to applied psychology in general.

The other additions to the staff have been mainly from the ranks of assistants who have proved themselves in the department. Charles Hurlbut Griffiths

(Campbell '13, Ph.D. Michigan '19) was assistant for one year and was then appointed Instructor in 1917. He has advanced to a professorship. Martha Guernsey ('19, Ph.D. '22), who later became Mrs. Walter Colby, was appointed Instructor in 1921 and was made Associate Professor in 1935. She devoted herself especially to child psychology. Carl Richards Brown (Kansas '11, Ph.D. Michigan '28) was appointed to the staff in 1921 and was promoted to an assistant professorship in 1929.

Adelbert Ford ('20, Ph.D. '26) was appointed Instructor in 1923, and in 1931 was appointed Professor of Psychology and head of the Department of Psychology at Lehigh University. He was succeeded in the same year at the University of Michigan by Norman Raymond Frederick Maier ('23, Ph.D. '28), who, after receiving his doctorate here, had spent one year at Long Island University and two years as National Research fellow at the University of Chicago. He advanced through the grades to an associate professorship in 1939. Maier was trained by Dr. Lashley for experimental work in brain lesions and their effects. He has developed work along that line here. Burton Doan Thuma ('23, Ph.D. '30) was appointed Instructor in 1928, and succeeded Ford as lecturer in the elementary course, Course 31, in 1931. At that time he was made Assistant Professor. He was promoted to be Associate Professor in 1939. George Meyer (California '27, Ph.D. Michigan '34) was appointed Instructor in 1930 and has continued to the present time, giving one of the courses in statistics. He was advanced to an assistant professorship in 1940.

Another staff member appointed from outside was Edward Barrows Greene (Amherst '18, Ph.D. Columbia '28), Instructor in 1928 and Assistant Professor in 1936, who devotes himself principally to tests and clinical psychology.

As to the laboratory, additional space was provided when, in 1903, the wooden building that had been used by Dr. Warthin as a pathological laboratory, and at times by the students of the College of Dentistry, was vacated upon Dr. Warthin's moving into the new Medical Building (West Medical Building). This greatly increased the space devoted to psychological laboratory work, and, moreover, made available a number of small rooms, but as permanent quarters the building was inadequate. Erected as an addition to the older building, originally a residence, that occupied the eastern part of the site of the present Natural Science Building, it had been intended as a homeopathic hospital. This addition had been made soon after Lord Lister's discovery of the importance of freedom from bacterial infection, and, in accordance with the widespread belief that hospitals should be torn down every few years to destroy sources of infection, it had been designed as only a temporary structure. However, after the erection of the new hospitals, it had been used for various purposes until finally the psychology laboratory fell heir to it. The many small rooms were partitioned off for privacy for students doing research work or for those working in the general course. It was here that Shepard started his laboratory maze, the maze that has seen continual service for more than thirty years with a constant accumulation of results, not many of which, unfortunately, have as yet been published. The old building fulfilled its function with a fair degree of efficiency, if not aesthetically, until 1915, when the psychology laboratory was established in the newly completed Natural Science Building.

Shepard was in temporary charge of the work in psychology in the year 1913 while Pillsbury was abroad on sabbatical leave, and so distinguished himself in his

work on planning a laboratory that the Regents asked him to take charge, first, of the building of the Natural Science Building itself, and later, for a period of years, of the general building program of the University. His title was Supervisor of the Building Plans during the years 1921-26.

The new laboratory which was developed in the Natural Science Building includes about forty rooms. Of special interest is the maze room, which is designed so as to offer no cues to the rat in running the maze, and so that the rats can be observed from a trap door in the room above. Another room of special design was a soundproof room, which was as free from sound as most rooms of that type. Extensive darkrooms were provided in addition to rooms for the main type of investigation in psychology. This available space was quickly outgrown, and in 1925 it was necessary to ask for space in the old Pharmacology Building; and later other space was provided on the third floor in the West Medical Building.

Some of the earlier students who have attained distinction in relatively recent times include Herbert H. Woodrow ('04, Ph.D. Columbia '09), Floyd C. Dockeray ('07, Ph.D. '15), John E. Winter ('06, Ph.D. '17), Joseph E. de Camp (A.M. '12, Ph.D. '14), Clark L. Hull ('13, Ph.D. Wisconsin '18), and Harry W. Crane ('09, Ph.D. '13). Woodrow went to Columbia for his doctor's degree, but did his research problem for his thesis at the University of Michigan in the summer. He is now chairman of the department of psychology at the University of Illinois. Dockeray, after completing the work on his doctorate at the University of Michigan, went to the University of Kansas, from there to Ohio Wesleyan University, and then to Ohio State University. Winter became chairman of the department of psychology at the Uni-

versity of West Virginia. De Camp, immediately after receiving his doctor's degree, went to Pennsylvania State College, where he is a professor. His thesis was one of the first in America on retroactive inhibition, and started much discussion. Clark Hull was appointed an assistant at the University of Wisconsin, where he did the work for the doctor's degree, aided by Professor Shepard, who had suggested the topic. Hull is now at the Yale Institute of Human Relations, and was president of the American Psychological Association in 1936. Harry W. Crane, Instructor in the University from 1913 to 1915, is now professor of psychology at the University of North Carolina and director of mental health and hygiene for the state of North Carolina.

Sven Froeberg (Bethany '03, Ph.D. Columbia '08), who held an instructorship from 1913 to 1917, is now professor of psychology and education at Gustavus Adolphus College. Ernest Burton Skaggs ('16, Ph.D. '23) was Instructor from 1922 to 1924. He is now a professor at Wayne University in Detroit. Forrest Lee Dimmick (Cornell '15, Ph.D. *ibid.* '20) served as Instructor from 1921 to 1925, when he left to become professor of psychology at Hobart College. John Duncan Finlayson (A.B. '12, B.D. Auburn Theological Seminary '14, Th.D. Harvard '16) was Instructor from 1921 to 1922, when he left to be president of Fairmont College; he was later president of the University of Wichita, and still later chancellor of the University of Tulsa. Howard Roscoe Mayberry (Ohio Univ. '18) came into the department as Instructor in 1924 and left in 1927 for a similar position in the University of Pittsburgh. Clarence Edwin Ragsdale (Missouri '13, Ph.D. Michigan '27) was Instructor in 1924-25, and then left for the University of Wisconsin, where he is now assistant professor of educational psychology. In 1928 Thorlief Grüner

Hegge (Ph.D. Royal Norwegian Univ. [Oslo] '18) came to the University on a National Educational Committee fellowship. After two years he became director of research at the Wayne County Training School and Lecturer in Clinical Psychology at the University of Michigan.

Heinz Werner (Ph.D. Vienna '14), compelled to leave the University of Hamburg through political disturbances, was a lecturer for the three years ending in June, 1936, on characterology and Gestalt psychology.

WALTER B. PILLSBURY

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THE DEPARTMENT OF ROMANCE LANGUAGES AND LITERATURES

THE study of Romance languages at the University was provided for in 1846 by the appointment of Louis Fasquelle to the professorship of modern languages, a chair that had been specifically listed in the organic act of 1837 as one for which provision should be made. His actual service did not begin, however, until May, 1847.

French was the first modern language taught in the University; it has been given continuously since the spring of 1847. According to the *Catalogue*, a short course in Italian was introduced in the fall of 1848 and one in Spanish in the spring of 1849, but, when German was begun the next fall, Italian and Spanish were dropped, and neither was revived for about twenty years.

This early development of modern language instruction was in accord with a general recognition among Eastern colleges of the desirability of these studies. Longfellow had been appointed professor of modern languages at Bowdoin in

1829 and professor of modern languages and belles-lettres at Harvard in 1836. Nevertheless, few permanent chairs in the modern languages were established; most of the colleges offering such studies gave them only sporadically and unsystematically. The early appointment of Fasquelle to a professorship of modern languages—perhaps the first to be maintained in the Middle West—was evidence of the progressive spirit characteristic of the framers of the curriculum, although the claim made by the Board of Visitors in 1848 that "in this respect the University possesses superior privileges" no doubt indicated a limited point of view (see Part III: DEPARTMENT OF GERMANIC LANGUAGES AND LITERATURES).

Throughout the period 1847-87 there was a professor of modern languages. A second full professorship was set up in the department in 1867, when Adam K. Spence, who had taught French continuously since the fall of 1859, as well as Greek (1858-67) and Latin (1860-63),

was appointed Professor of the French Language and Literature. In the autumn of 1870, upon the resignations of Spence and of Edward P. Evans, Professor of Modern Languages, the Board of Regents found the time opportune for a change of policy. Henry S. Frieze, who was then Acting President, later described the situation in the following words:

In 1870 the resignation of the professors of German and French in the University of Michigan led the regents to adopt the plan of organizing the instruction in modern languages under one professor with assistant instructors; and they authorized the Acting President to engage someone competent to take charge of the department. (Frieze, p. 70.)

The professorship of the French language and literature was thereupon discontinued for the time, and an attempt was made to bring in foreign-born instructors to teach the elementary work in their native languages. Soon afterward two instructors in French and one in German were giving the elementary and intermediate work, and the department head was teaching the intermediate and advanced French and senior German, in addition to a class in Italian.

In 1887 the Regents granted a departmental petition requesting the formation of the Department of Romance Languages and Literatures and the Department of Germanic Languages and Literatures.

In 1889 special courses in French and German for engineering students were segregated. The Department of Engineering was made a separate unit in 1895, but until 1904 the French and Spanish credited toward graduation in engineering continued to be given in the Department of Romance Languages. In May of that year the Regents appointed William Henry Wait (Northwestern '79, Ph.D. Allegheny '88), who had conducted German classes for engineering students since

1901, Professor of Modern Languages in the Department of Engineering, and it was not until 1928 that the work in German and the Romance languages was transferred back to the College of Literature, Science, and the Arts. In 1931, by a vote of the faculty of the College of Engineering, foreign languages were eliminated as subjects required for graduation, and as a result the enrollment in Romance languages dropped from 2,571 (1930-31) to 2,201 (1931-32). As early as 1914, to provide for the special needs of students in science, Alfred O. Lee, then Assistant Professor of Modern Languages in the Department of Engineering, offered a course in the reading of French scientific works and current journals.

Aside from the changes in the method of providing language instruction for engineering students, the only major change in the structure of the Department of Romance Languages was the introduction in 1933 of the new form of administration by a committee acting with the chairman, similar to the reorganized government of the College of Literature, Science, and the Arts which went into effect in August of that year (see Part III: ADMINISTRATION AND CURRICULUMS).

During the past hundred years the Romance language staff has been augmented to meet increases in enrollment, courses have been multiplied to satisfy the growing demand and a constantly developing interest, new fields of study have been opened up in response to various needs as these became apparent, and graduate work has been fostered and intensified. From its very modest beginnings the Department of Romance Languages and Literatures has expanded until at the present its staff numbers three professors, seven associate professors, seven assistant professors, thirteen instructors, and four teaching fellows. In 1940 it had an enrollment of 1,893 at the end of the second semester and of-

fered forty courses—seven elementary, nine intermediate, and twenty-four advanced.

The old Museum was remodeled for the use of the department in 1928 and was designated the Romance Language Building.

FRENCH

LOUIS FASQUELLE, 1847-62.—A course in French was announced for the first time in the *Catalogue* for 1846-47. This course was given in the last third of the sophomore year. Another term was added in the autumn of 1848, the first term of the junior year. There was no indication of the content or character of these courses. However, in the *Catalogue* for 1852-53, under the heading of modern languages, was the following statement: "The course of instruction in this department occupies one daily recitation during six terms, or two years. One half of the time is devoted to the French language, the other half to the German." There followed a description of each term's work, with the titles of the textbooks used and of the literary works read.

Although in the *Catalogue* Fasquelle was designated as Professor of Modern Languages and Literature from 1854 onward, the instruction offered in French presented no change of consequence until 1858-59, when it was extended from one year to three semesters, beginning in the sophomore year and continuing through the junior year. In 1859-60 the program was again limited to two semesters, but Adam Knight Spence ('58, A.M. '61), formerly Instructor in Greek only, was made Instructor in Greek and French.

The professors at the University in its early days are reputed to have been rather picturesque characters, and not the least picturesque among them, apparently, was Louis Fasquelle, whose

struggles with the intricacies of English pronunciation, accent, and emphasis, not to mention idiom, gave rise to many stories that ultimately became classic and of general application. He was born in 1808 near Calais, France. His education he received at the famous École Polytechnique in Paris. He studied also in Germany. Because of his participation in the revolutionary movement of 1830, he left France for England, where he taught French and married. In 1832 he came to the United States. "He bought a farm in Michigan and divided his time between farming and the teaching of French to private pupils until his appointment to the chair of Modern Languages. . . ." (Hinsdale, p. 223). For this post he was well fitted, because of his training, travels, and teaching experience. Virtually a pioneer in the field, he published during the last decade of his life (1852-61) a comprehensive series of textbooks for the teaching of French which, widely used throughout the country, contributed not a little to the prestige of the University. As a professor he proved "peculiar but very learned and proficient." He was considered one of the University's "brightest ornaments and one of the most faithful, devoted and useful members of its Academic Faculty," and his death in October, 1862, left a vacancy "not easily to be supplied" (*R.P.*, 1837-64, p. 1033).

EDWARD P. EVANS, 1862-70.—After serving for a year as an instructor Edward Payson Evans ('54) became head of the department as Professor of Modern Languages and Literature in October, 1863. It may be noted in passing that he was apparently the first University officer charged officially with keeping the records of the alumni.

Evidence of increased interest in the study of modern languages and literature, or of greater ambition on the part of the staff, may be seen in the an-

nouncement in the *Catalogue* for 1863-64 that the subjects taught in the department were: (1) the French and German languages, (2) French and German literature, and (3) the general principles of comparative philology.

In 1864 another year of French was added to the scientific curriculum, and when the Latin and scientific course was introduced in 1867, two and one-half semesters of French were included in it. At the same time, however, one-half of the recommended year of French in the classical course was made optional.

GEORGE S. MORRIS, 1870-79.—George Sylvester Morris (Dartmouth '61, Ph.D. hon. Michigan '81) was appointed to the professorship of modern languages and literature in 1870. In his first year he was assisted by Instructor Jules Frederick Billard (Hobart '58, A.M. *ibid.* '61, M.D. Howard Univ. '84) in French and by Augustus Maasberg in German. The next year Robert Harbison replaced Maasberg, and there were two younger men teaching French, Billard and Paul Rousseau Bellon de Pont, Instructor in French and Drawing, who had prepared in both arts and science at the Collège Rollin, Paris. The content and number of the courses in 1871-72 remained substantially the same, except that in all French classes French conversation and composition were included. Alfred Hennequin (A.M. hon. '73, Ph.D. Lenox Collegiate Inst. '82) became Instructor in French in 1872, succeeding Billard. In 1872-73 it was announced that the courses in French would thereafter be essentially changed, and the following year it was stated that the work would be "directed in general towards increased practical facility in speaking and writing." Candidates for admission to the classical course were advised to study French at least one year before entering the University, but for admission to the other courses French was required. Mention was made in the *Cal-*

endar for 1874-75 of the "large facilities for the study of the Modern Languages with reference to the oral use of them, or to the reading of foreign treatises on Science."

Morris had had excellent preparation in philosophy and was eager to continue in that subject. For several years after 1877 he divided his time between Johns Hopkins and the University of Michigan, teaching at Baltimore from Christmas vacation until the second semester. He attempted to resign from the University of Michigan in June, 1879, but consented to remain one more semester while his successor, Edward Lorraine Walter ('68, Ph.D. Leipzig '77), completed certain studies abroad. Walter had been an assistant professor in the Department of Latin since 1868 and acting head of that department for two years. In 1881-82 Morris returned to Ann Arbor to teach his favorite subject, philosophy. From 1870 until his death in 1889, he served on the faculty during at least a part of every academic year except 1880-81, and his thought had a profound effect upon the scholarly life and reputation of the University.

EDWARD L. WALTER, 1879-98.—In July, 1887, Edward L. Walter and another member of the department, Calvin Thomas ('74, A.M. '77, LL.D. '04), presented to the Regents a memorial in which they urged that the Department of Modern Languages be divided, and that there be established "in lieu of the present single professorship of Modern Languages, two professorships, one of Romance Languages and Literatures and one of Germanic Languages and Literatures." Figures were presented to show that the Department of Modern Languages was then the largest in the University, and reference was made to the growth of modern philology and to the practice in German universities and in some of the universities of this country,

such as Johns Hopkins, Bryn Mawr, Cornell, and Indiana. The memorial read in part as follows:

So far as our own University is concerned, a considerable extension in the scope of its instruction is desirable. There should be continuous instruction in both Italian and Spanish. Opportunity should also be offered as soon as possible to advanced students for the study of Old French, Provençal and Portuguese, and also for work in the Comparative Philology of the Romance tongues. In the Germanic field, more work of a philological character for advanced students is needed. (*R.P.*, 1886-91, p. 135.)

The Board immediately took favorable action and appointed Calvin Thomas to the professorship of the Germanic languages and literatures and E. L. Walter to that of the Romance languages and literatures—a position which, along with the headship of the department, he held until his death in the wreck of "La Bourgogne" on July 4, 1898.

GEORGE A. HENCH, 1898-99.—George Allison Hench (Lafayette '85, Ph.D. Johns Hopkins '89), head of the Department of German, was then made acting head of the Department of Romance Languages, but this interim appointment was brought to an unfortunate end by his death in an accident in the summer of 1899. President James B. Angell thereupon assumed personal charge and directed the affairs of the department throughout the next academic year.

ARTHUR G. CANFIELD, 1900-1926.—In 1900 Arthur Graves Canfield (Williams '78, A.M. *ibid.* '81, Litt.D. Michigan '35) was appointed Professor of Romance Languages and head of the department. He retired as administrative head of the department in May, 1926, but continued his teaching until he became Emeritus Professor in 1929.

Registrar de Pont died March 1, 1906, after thirty-five years of teaching French in the department. In 1912 John Robert

Effinger ('91, Ph.D. '98), who had entered the department as Instructor in 1892, was promoted to a full professorship and made Acting Dean of the Department of Literature, Science, and the Arts. He was appointed to the deanship three years later. In spite of the increase in his administrative duties Dean Effinger continued his services to the department until his death in 1933.

During Canfield's chairmanship of the department the number of courses offered was increased from thirty to well over fifty, the teaching staff was correspondingly enlarged, seminars were organized, principally for graduate students, the journal club was organized (see p. 721) to give to members of the department and advanced students an opportunity to review and discuss in common at frequent regular intervals the results of current research, and the teachers' course was further developed. Gradually the offerings in French conversation and writing, in Romance philology, and in modern and contemporary French literature and civilization were increased.

Professor Canfield did much by precept and example—both in his teachers' course and outside it—to encourage and improve modern language teaching in the schools throughout the state. His own special fields of interest were and still are the study of the beginnings of romanticism and realism, various aspects of the study of Balzac and his works, particularly the question of chronology and the matter of reappearing characters. His published contributions on these subjects are recognized by competent scholars as distinctly significant. When on his retirement the Regents in a tribute mentioned his "quietly efficient devotion to his work and his unusual ability to co-operate with others, and a gentleness of nature which have made him a delightful colleague and well-

beloved teacher," they were but voicing the feelings of his fellows both inside and outside the department, in fact of all privileged to know him.

HUGO P. THIEME, 1926-40.—At the June meeting of the Regents in 1926 Professor Hugo Paul Thieme (Johns Hopkins '93, Ph.D. *ibid.* '97) was appointed Chairman. He had come to the University as an instructor in French in 1898 and had advanced to a full professorship in 1914. In the fourteen years of his chairmanship he displayed remarkable energy and exercised his gift for organization and his talent for systematization. Under his vigorous guidance the previous development of courses was continued. In oral French and French composition the work was reorganized and new courses were introduced, the offerings in Romance philology were further expanded, and more intense and specialized instruction in modern and contemporary literature was provided. He paid particular attention to the development of the courses on the graduate level.

Professor Thieme was to have retired on June 30, 1940, but he died on June 2, after a severe illness of several months, and Hayward Keniston (Harvard '04, Ph.D. *ibid.* '11) was called from the University of Chicago to be Professor of Romance Languages and Chairman of the Department of Romance Languages and Literatures. Professor Thieme had been in the department for forty-two years and was a member of the council of the *Société des textes français modernes* and American correspondent of the *Revue d'histoire littéraire de la France*. For his scholarly work and for his tireless efforts in behalf of an understanding of French culture in this country, he was made Chevalier of the Legion of Honor in 1923; in 1929 he received the *Prix de la langue* of the French Academy; and his great bibliography was crowned, upon its publication, by the Academy.

Since the new organization was adopted in 1933 (see p. 715), the department has been administered by a chairman and an executive committee of four appointed by the dean and executive committee of the College. This provides for greater participation on the part of the staff in matters of administration and policy.

THE PERIOD OF THE WORLD WAR.—As might be expected, the peak in the study of French was reached in 1918-19, when French I, a four-hour course, was given at every hour from 8 A.M. to 3 P.M. inclusive, and seventeen instructors were employed, two of whom were women. These two, Mme Pargment and Mme Pawlowski, were designated as teaching assistants in French. That year several members of the University faculty who normally taught German—Professors Wait, Scholl, and Lee—were busy teaching beginning French. Among those teaching second-year French were Professors Bonner and Winter of the Departments of Greek and Latin. Michael S. Pargment (Dipl. d'études univ., Paris '11) gave an intermediate course in military French for enlisted men in the Students' Army Training Corps. In this course special emphasis was placed on the spoken language. Jean Petit gave an advanced course in military French, which was open to men in military training who had had more than two years of French. Emphasis was placed on spoken French for the military services. Similar courses were given in the College of Engineering. During the war, several members were on leave: Assistant Professor René Talamon (Lic.-ès-lettres [lettres], Paris '00, Lic.-ès-lettres [langues], *ibid.* '01), for the duration of the war in service with the French army; Herbert Alden Kenyon, then an assistant professor, in Washington with the Military Intelligence Division of the General Staff; Instructor Harry Carleton Barnett (Dartmouth '12, A.M. Michigan '17), with a

hospital unit in a southern camp; Assistant Professor Philip Everette Bursley ('02, A.M. '09), in Paris at the American University Union; and Instructor Eugène Étienne Rovillain (Columbia '15, A.M. Michigan '18), in France with the French forces. As soon as the army was installed at Camp Custer, Battle Creek, Michigan, Canfield, accompanied at first by Rovillain and William Aloysius McLaughlin (Harvard '03, A.M. *ibid.* '20), then Assistant Professor, and later by Professor Thieme, set out once a week to give three lessons in French to the officers. This continued for months. Eventually Thieme superseded Canfield and during the summer was in uniform in complete charge of French at the camp and attached to the Y.M.C.A.

FRENCH CONVERSATION.—To make certain that students have an ample opportunity to perfect themselves in French pronunciation and to acquire facility in conversation, the staff has always included a number of teachers whose native tongue was French or who were bilingual. Notable among these have been Assistant Professors Paul R. B. de Pont and André Béziat de Bordes (Ph.D. Chicago '99), Jean B. Cloppet (Lic. en phil., Coll. Propaganda [Rome] '06, Doc. en phil., *ibid.* '08), and Louis Chopard (Dipl. d'études supérieures de droit publique, Paris '25, Dipl. d'études supérieures de droit privé, *ibid.* '26). This work is now under the direction of Associate Professor Talamon, assisted by other staff members, particularly by Assistant Professor Charles Emile Koëlla (Lic.-ès-lettres classiques, Lausanne '11).

VISITING PROFESSORS.—In 1925-26 Professor Charles Cestre (Lic.-ès-lettres, Paris '93, Agrégé d'anglais, *ibid.* '95, Doc.-ès-lettres, *ibid.* '06), lecturer on American literature at the Sorbonne, gave a course called *La Société française contemporaine d'après la littérature et d'après la vie*. Already in 1921 he had

given a course of six University lectures on the contribution of France to the universal ideal of mankind. In 1929-30 Professor Henri Chamard (Lic.-ès-lettres, Paris '88, Agrégé des lettres '90, Doc.-ès-lettres, Paris '00), of the Sorbonne, offered two courses, one on French literature of the sixteenth century and the other on that of the seventeenth century. In 1922-23 an innovation was introduced by the appointment to the staff of Marcel Clavel (Lic.-ès-lettres, Paris '19, Dipl. d'études supérieures, Lille '20, Agrégé d'anglais, Paris '21), who announced a course called French Classicism in England, intended for students specializing in English or French. The following year Clavel offered in addition *La Littérature française par l'explication de textes* and a course on Rousseau and England. In 1929, after Clavel's return to France, Jean Edouard Ehrhard (Lic.-ès-lettres, Paris '23, Dipl. d'études supérieures, *ibid.* '27, Agrégé des lettres '28) was appointed Assistant Professor. He gave a course in French literature dealing with the main literary movements in France from the middle of the nineteenth century to the present day, and another, *Explication de textes*. Ehrhard returned to France after a few years.

GRADUATE STUDIES.—Graduate courses in the field of the Romance languages have been given at the University for over eighty years. In 1858-59 the *Catalogue* contained a "Programme of Studies for the Degrees of A.M. and M.S.," in which a course in French literature by Fasquelle was announced for the first semester. For many years thereafter a similar course was offered. In the petition for the establishment of separate departments for the Germanic and the Romance languages in 1887 it was urged that the instruction in both Italian and Spanish should be continuous, and that as soon as possible advanced students

should have an opportunity to study Old French, Provençal, and Portuguese. In fact, Old French was offered for the first time in 1889, Provençal in 1900, and Portuguese in 1894. Old French and Provençal have been announced continuously since those dates, but, up to June, 1940, Portuguese was not offered again. Since 1914 the work in Provençal has been given by Edward Larrabee Adams (Harvard '00, Ph.D. *ibid.* '07).

Only a very general statement regarding graduate work in French appeared in the *Graduate School Announcement* before 1899, when the names of instructors and more detailed course descriptions were first given and the number of courses began to increase. In 1900 there was a distinct expansion in this work—an expansion which has continued until at present there are advanced courses dealing with every period of French literature from its origin to the present day, the various literary genres—criticism, drama, lyric poetry, the novel—the early history of the language, civilization, and the history of ideas. Today, requirements for advanced degrees, as well as programs of preliminary examinations according to the field of major interest, are very definitely set forth. The department has been enriched by the advent of specialists in various fields who devote much of their time and attention to initiating candidates into the problems of research, training them in methods, and critically supervising their work as it progresses. There has been a marked increase of late in the number of doctorates granted and in the number of doctoral theses in preparation in this department.

SUMMER SESSION.—Courses in French have been offered in the summer session since its inception in 1894. Of late years a sufficient number of graduate students have been in attendance to warrant the offering of an increased number of graduate courses in French. In order to give

summer session students an opportunity for a practical use of French, a *Maison Française* has been organized, in which board, room, and recreation facilities for a limited number of women are provided. A *Cercle Français* has also been organized for the benefit of summer session students, both men and women.

SOCIETIES.—In the *Calendar* of 1901–2 an announcement was made of a journal club in which reviews were given of current research in the field of Romance languages and literatures by the instructors in the department and advanced students. The journal club continues—though under another name, the Romance club—and now meets periodically throughout the year for the same purpose as indicated in 1901.

The *Cercle Français* (see Part IX), organized in 1902 by and for students interested in French, has effectively supplemented the oral work.

PUBLICATIONS.—Among the more outstanding publications by the staff, aside from editions of textbooks, are Thieme's three-volume *Bibliographie de la littérature française de 1880 à 1930* (1933), Adams' *Word Formation in Provençal* (1913), Newton S. Bement's *French Modal Syntax in the Sixteenth Century* (1934), and Warner F. Patterson's *Three Centuries of French Poetic Theory* (1935).

WILLIAM A. McLAUGHLIN

SPANISH

Spanish was listed for the first time in the *Catalogue* of 1848–49. A short course was offered by Professor Louis Fasquelle in the third term of the junior year. This course must have been given as announced, for on July 16, just before Commencement, the secretary of the faculty recorded that a certain junior, Samuel Harper, was found deficient in Spanish.

There was no further mention of Spanish until the spring of 1868, when it was listed with Italian as a senior elective in

all the curriculums in the Literary Department except that for mining engineering. Instruction in these two languages was offered again during parts of the next two academic years. It appears that from 1870-71 through 1886-87 Italian and Spanish were given alternately, first by Professor George S. Morris, and then, beginning in 1880, by Professor Edward L. Walter. A prerequisite of one year of French was established in 1881, not to be removed until 1909. In 1884 Spanish was expanded to a two-semester course. Instruction in Spanish has been continuous since 1886, except for one semester in 1888.

When the first-year Spanish work was taken over by Eugene Leser (Ph.D. Berlin '87) in 1893-94 an additional course was offered—a one-semester, one-hour course on Calderon by Professor Walter Benjamin Parsons Bourland ('89, Ph.D. Vienna '97) had charge of the elementary courses in 1894-95. The following year he went abroad to study, and Moritz Levi ('87) taught the elementary courses. A fourth semester of Spanish, a one-hour course on *Don Quixote*, was introduced in 1895-96. In 1898, with the return of Bourland to take full charge of the work in Spanish, the two first-year courses became three-hour courses, and those in the second year were also increased to two hours each. It was not until 1909 that the two courses comprising the first year's work were converted into four-hour courses. A third-year course on Cervantes and the literary history of the Golden Age was added in 1900. From 1901 to 1904, when all the work in Spanish except that for the engineering students was in the hands of Winthrop Holt Chenery (Mass. Inst. Technol. '96, Ph.D. Harvard '04), there were no changes made in the courses offered.

In 1904, with the coming of Charles Philip Wagner (Yale '99, Ph.D. *ibid.* '02), there began a period of gradual

growth and expansion that has continued to the present day. Until 1913 evidence of this interest in Spanish was to be seen in the constant increase in the number and variety of advanced courses offered; after 1913 that interest was most apparent in the addition of sections and the consequent increase in personnel. For example, in 1903 one section was sufficient to care for all beginning students, but in 1914 it was necessary to provide five sections, in 1916 twelve, and in 1919 fifteen. To care for the greater teaching load, one assistant was provided from 1909 to 1914, three were required in 1914, seven in 1916, and fifteen in 1920, when the total enrollment in Spanish classes reached a maximum of 4,339 semester hours.

As it was neither expedient nor physically possible to offer all of the courses every year, a system of rotation was devised that would make the more fundamental courses available every two years, and the more specialized courses every three or four years. The study of *Don Quixote*, which started as an irregular, one-hour, one-semester course, developed first into a two-hour course, then, in 1907, into a sequence of two two-hour courses, and in 1910 into a year course of three hours each semester offered practically every year. Spanish-American literature has been taught every year since 1925.

Special courses for engineering students in the first two years of Spanish were conducted between 1901 and 1928. At first this work was in the Department of Literature, Science, and the Arts and was under the direction of Colman Dudley Frank ('97, A.M. '02), Instructor in French and Spanish. When the Department of Modern Languages was formed within the Department of Engineering in 1904, James Pyper Bird ('93, Ph.D. '18) was put in charge of this work. In 1915 he was succeeded by Herbert Alden Kenyon (Brown '04, A.M. *ibid.* '05), who continued in that

capacity until, in 1928, the department was reabsorbed into the corresponding departments of the Literary College. In the peak year 1921-22 nine sections of Spanish were provided in the College of Engineering and additional instructors were engaged.

In 1939-40 the Department of Romance Languages and Literatures gave twenty-six courses in Spanish, in some of which, especially the elementary courses, there were many sections. In all, seventy-nine separate sections or classes were conducted—forty-eight elementary, twenty-seven intermediate and advanced, and four exclusively graduate.

Today a student interested in Spanish may go from his first two years of elementary work into courses devoted to literature, conversation, or composition, where he will receive special training and preparation for more advanced work. For the graduate student and the prospective teacher, various basic courses are offered in Old Spanish language and literature, philology, phonetics, pedagogy, and grammar. Outside the classroom the interest of the faculty and students has found expression in Spanish plays, radio, and in the social activities of the Sociedad Hispanica (see Part IX).

Charles P. Wagner was coeditor, with Louis How, of *The Life of Lazarillo de Tormes* (1917), and in 1929 the first volume of his *El Libro del Cauallero Zifar* appeared.

JOSEPH N. LINCOLN

ITALIAN

In the autumn of 1848 the seniors in the Department of Literature, Science, and the Arts were permitted to take a one-term course in Italian, taught by Louis Fasquelle, Professor of Modern Languages. It was recorded in the faculty minutes that sixteen seniors (exactly two-thirds of the senior class) were examined in Italian on December 20, 1848,

and that all but one of them passed.

Italian was not offered again for nearly a score of years. In 1867-68 it was listed, along with Spanish, as a second-semester senior elective in five of the six programs in the Literary Department. For the next several years, although neither language was mentioned in the list of requirements and electives, a course in Italian extending through "a portion of the collegiate year" and a similar one in Spanish were announced in the brief general description of the work in modern languages. It was at least tentatively decided in 1870-71 that these two courses should be alternated, each of them to be given once in two years. In 1872 George S. Morris, then head of the Department of Modern Languages and Literature, reported that during the second semester, "with the permission of the faculty," he had taught a two-hour elective course in Italian for juniors and seniors. From the *Calendar* it appears likely that the plan of alternating Spanish and Italian was followed continuously, though with some irregularities, until June, 1887.

The *Calendar* of 1878-79 was the first in which the names of the teachers regularly appeared with the names of all courses, and also the first in which the content of the Italian course was definitely, though briefly, outlined. Cuore's *Italian Grammar* and Foresti's *Italian Reader* were the texts which Morris used. According to the definition of "full" (i.e., five-hour) courses, a fixed number of which were required for graduation under the regular "credit system" that went into effect the same year, the two-hour course in Italian was regarded as a "two-fifths course."

E. L. Walter took charge of the Department of Modern Languages in the winter of 1880. He taught Italian to thirty-eight students, who, he reported, completed about half the grammar and read about twenty-five pages in the

reader. In his published report to the president he urged that greater facilities in Romance languages be offered, for "no earnest student of literature can afford to be ignorant of the languages of Dante and Cervantes."

Some progress toward this goal was made when, in 1883-84, a one-year course in Italian (two hours credit each semester) was offered. In the meantime, beginning in 1881-82, a prerequisite of a year of French, or its equivalent, had been established, and *I Promessi sposi* had been substituted for Foresti's *Italian Reader*. Even more significant, however, was the introduction of a two-hour semester course in Dante, first given by Professor Walter in 1888, only a year after he had been made head of the Department of Romance Languages and Literatures. In addition to the course devoted to the *Divina Commedia*, a one-hour course in the *Vita Nuova* was begun in 1892-93 by Raymond Leslie Weeks (Harvard '90, Ph.D. *ibid.* '97), Instructor in French. After Weeks left in 1893 Professor Walter took charge of the course and continued to give it and the regular Dante course until 1898, the year of his death.

From 1893 to 1923, the date of his retirement, Professor Moritz Levi, in addition to teaching French, offered courses in Italian. Others who at one time or another have been engaged in the teaching of Italian are: William A. McLaughlin, Herbert Douglas Austin (Princeton '00, Ph.D. Johns Hopkins '11), George Livingstone Hamilton (Harvard '95, Ph.D. Columbia '03), Stephen Scatori (Tulane '14, A.M. Michigan '18), Michele de Filippis (Brown '20, Ph.D. California '33), John Revell Reinhard (Harvard '15, Ph.D. *ibid.* '21), and Aubrey Tealdi (Lic., R. Ist. Tec. Livorno '00).

At one time or another between 1898 and 1930, Levi, McLaughlin, Hamilton, Austin, and Reinhard gave the Dante course, which had been expanded to in-

clude the *Vita Nuova* and a consideration of Dante's minor works, and which was extended over two semesters. In 1914-15 Austin introduced a graduate course of two semesters called the Origins of Italian Literature, and in 1925-26 Reinhard introduced as graduate courses the Renaissance, the *Novellieri*, and Petrarch.

In 1930 Camillo Pascal Merlino (Harvard '23, Ph.D. *ibid.* '28) was invited to take charge of all instruction in Italian. In addition to the courses available up to this time, the following new offerings, usually given in cycles, were admitted to the curriculum: Composition and Conversation; Italian Literature from 1870 to the Present Day; the Masterpieces of Italian Literature; and Introduction to Old Italian Language and Literature, including special treatment of Petrarch and Boccaccio. A Dante course in English was offered for the first time in the summer session of 1936. In 1937 Merlino accepted a position at Boston University.

The elementary Italian course, in addition to advanced work, is taught by Vincent Anthony Scanio (Buffalo '30, Ph.D. Michigan '37), who joined the department in 1931 as an instructor. There are at present three sections of this course, one of which is designed especially to meet the needs of the students of the School of Music.

There is now a complete curriculum in Italian with courses of a practical, literary, and historical nature, thus allowing for an undergraduate major as well as for a program of studies leading to the master's and doctor's degrees.

LIBRARY FACILITIES.—In addition to a very adequate collection of Italian texts and scholarly publications on the language, literature, and history of Italy, the General Library now contains several special collections of much value. Professor Walter bequeathed to the University his own library of about 2,100 volumes, of which some 800, in-

cluding nearly 500 Dante items, comprising the nucleus of the Italian collection.

The Pèrcopo collection of 1,500 volumes, the private library of the late Professor Erasmo Pèrcopo, of the University of Naples, was purchased in 1928. It includes, besides many single publications, 278 volumes containing more than four thousand research articles and monographs, many of which are very rare or otherwise inaccessible in this country.

The collection is now fully catalogued.

In 1932, Mrs. LeRoy Crummer presented to the University thirty-nine rare editions of Castiglione's *Il Cortegiano*. These, added to the ten already in the library, make this without a doubt one of the finest collections of its kind in the world. Probably the largest and most valuable library of Italian dialect dictionaries outside Italy is the special collection of 124 purchased in 1933.

CAMILLO P. MERLINO

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THE DEPARTMENT OF SOCIOLOGY

THOUGH the Department of Sociology of the University has been in existence only since 1931 the history of the teaching of the subject runs back into the last century. Three periods of its development are distinguishable preceding the establishment of an independent department.

THE FIRST PERIOD, 1881-94.—It may be assumed that during this period there was an interest in what later came to be called sociology because of the offering in three entirely separate departments of courses which touched upon so-

ciological subjects. Of these, perhaps the most interesting from a historical standpoint is one entitled Social Science, which was given five times between 1881 and 1887 by Edward Swift Dunster (Harvard '56, M.D. New York College of Medicine '59), Professor of Obstetrics and Diseases of Women and Children. This course, which was in the School of Political Science (see Part IV: DEPARTMENT OF POLITICAL SCIENCE), was described in the *University Calendar* for 1881-82 (pp. 80-81) as follows:

Lectures on the following topics: 1. Intro-

ductory: the scope and purposes of Social Science, and its relations to socialism, so called, to sanitary science, and to political economy. 2. Historical: theoretical or ideal systems, Plato's Republic, Campanella's *Civitas Solis*, More's Utopia; practical efforts to establish social systems or communities, the Essenes, the Shakers, the Perfectionists of Oneida, the Colonies of St. Simon, Robert Owen, Charles Fourier. 3. Poverty and its Prevention: causes of poverty; organized efforts for the relief of the worthy poor; treatment of the unworthy poor; the problem of the tramp; almshouses and their superintendence. 4. The Prevalence of Crime, and the means of diminishing or preventing it: (a) the relation of crime to poverty, to vicious habits, and to hereditary influences; (b) prostitution, its causes, prevalence, and dangers, and the means of preventing it; (c) care of the children of the criminal and pauper classes, State schools for abandoned or neglected children, the Michigan State School at Coldwater; (d) the punishment of crime, the object of punishment, prison labor, treatment of criminals after release; (e) penal institutions, their construction and management. 5. Practical Questions in Social Science: (a) the care of the insane and the management of asylums, the cottage system, the associated or central system, qualifications of superintendents and assistants; (b) the care and training of the feeble-minded; (c) the care and training of the blind. 6. Economic Problems: (a) conservation of life, the prevalence and increasing frequency of suicide, means of preventing suicide; (b) conservation of property; (c) conservation of food, game laws, pisciculture.

This course of Dunster's has received mention (Bernard, p. 13) as one of the more successful early attempts to assemble materials which would constitute the new academic discipline for which many college heads were groping.

During the eighties and early nineties, Henry Carter Adams (Iowa College '74, Ph.D. Johns Hopkins '78), first as Lecturer on Political Economy and later as Professor of Political Economy and Finance, was touching on the sociological

field from the angle of political economy. He gave, under various titles, courses in economic problems in which he discussed proposed social and industrial reforms. Among other topics he gave attention to immigration, industrial classes, poor laws, and socialism. It should be noted that Adams was the one who first suggested to Charles Horton Cooley, then a graduate student in economics but later the chief figure in the development of sociology at the University, that he attempt to develop courses in sociology within the Department of Political Economy (see Part III: DEPARTMENT OF ECONOMICS). Therefore to Professor Adams must be accorded chief credit for the introduction of the new discipline. Cooley himself was glad to acknowledge help from another source. He said:

Indeed, one of the Regents, Levi L. Barbour, a man of real distinction in mind and character, greatly interested at that time in penal reform, was most appreciative both of my work and of the promise of sociology. It was through his exertions, largely, that an instructorship in sociology was formally established in 1895, and that my later promotions were obtained. (Cooley, p. 10.)

The third avenue through which sociology was being approached was the political philosophy of John Dewey, then Instructor in the Department of Philosophy (see Part IV: DEPARTMENT OF PHILOSOPHY and DEPARTMENT OF PSYCHOLOGY). In 1889-90 he gave his first course in this field, and by 1892-93 he was giving two, the first of which was designated Political Philosophy: the Theory and Institutions of Social Organization, and the second, Special Studies in the History of Political Philosophy. In the latter course Spencer's *Sociology* was specifically mentioned as one of the texts. Cooley notes that he attended these lectures in 1893-94 (Cooley, p. 6). Although he felt that he was more influenced by Dewey's personality than by his lectures,

we may surmise that his later psychological approach to sociology was not uninfluenced by Dewey's viewpoint.

THE DEVELOPMENT OF A CURRICULUM, 1894-1917.—A sound but not elaborate curriculum in sociology was established in this second period, in which Charles Horton Cooley ('87, Ph.D. '94) was the central figure; in fact, his influence has been dominant throughout the period in which sociology has been taught at the University. Cooley had been prepared for this work not so much by specialized study in the field as by broad grounding in the humanities and in the political economy of his day. The son of Judge Thomas McIntyre Cooley, he had had unusual opportunities for study and travel and had already been employed on two research projects in Washington of an economic character. He had begun teaching courses in economic theory and statistics in 1892, and he took his doctorate in political economy in 1894 with a thesis on the theory of transportation. For a number of years after he began to teach sociology he continued his courses in political economy, the last course in this field which he relinquished being that in statistics, which he gave for the final time in 1900-1901.

Cooley gave the first courses bearing the name Sociology during the academic year 1894-95: Principles of Sociology, and Problems of Sociology. As other members were added to the staff, he assumed general charge of the work. Though his undergraduate courses soon became large, it was with the more thoughtful graduate students that his success as a teacher was most marked. To the brilliance of his own thought he added painstaking criticism of the thought of those less mature. Through his writing he exerted an influence beyond the campus; his great trilogy, *Human Nature and the Social Order* (1902), *Social Organization* (1909), and *The So-*

cial Process (1918), gained for his sociological theory a wide acceptance. Indeed, these books have become classics which are referred to wherever sociology is taught. He was given national recognition by being selected as president of the American Sociological Society for the year 1918.

During the period 1894-1917 Cooley carried most of the teaching burden in sociology. In addition to the courses already mentioned, he had added by 1903 Special Studies in Sociology, Historical Development of Sociological Thought, Psychological Sociology, and Social Development of the Church. In the year 1902-3 Kenyon L. Butterfield (Michigan State '91, A.M. Michigan '02, LL.D. Amherst '10), later president of Michigan State College, gave a course known as Rural Sociology. This was probably the first use of the term which has since come to designate so large a branch of sociological study. Not until 1910-11 did a second teacher of sociology appear again. This was Carl Eugene Parry ('05, Ph.D. '09), who, besides teaching political economy, taught Criminology and Social Origins and repeated the course Social Origins in the two following years. Parry has since had a distinguished career as a research economist with the Federal Reserve Board. He is now Chief of the Division of Security Loans of the Federal Reserve System.

The year 1913-14 marked the first appointment of a full-time instructor to aid Professor Cooley. He was Warren Simpson Thompson (Nebraska Wesleyan '07, Ph.D. Columbia '15), now the director of the Scripps Foundation for Research in Population Problems and an authority on population questions. In 1914-15 he offered the courses Social Evolution and Social Problems of Rural Life, and the following year added Social Statistics and Immigration. Thus, as the second period closed there were two full-time

men teaching sociology in some thirteen courses.

EXPANSION AND SPECIALIZATION, 1917-30.—The years 1917-30 constituted a period of rapid expansion and differentiation of the work in sociology. Especially notable was the development of courses in social problems and social work which followed the advent of Arthur Evans Wood (Harvard '06, S.T.B. *ibid.* '11, Ph.D. Pennsylvania '20) in 1917. It is true that Cooley had offered since 1913-14 a course entitled *Seminary in the Principles of Social Case Work*, but Wood, besides taking this over, added *Criminology*, *Community Problems*, and *Problems of Poverty*, and made arrangements for a limited number of students to receive credit for field work in social agencies. The *Family* was a course added by him in 1919-20. In 1921 he was made director of the curriculum for the training of social workers and thereafter arranged for the offering of courses by specialists in various fields of social work, both from other units of the University and from outside.

In 1918 Thompson gave up his teaching to do war work in Washington, and Roy Hinman Holmes (Hillsdale '11, Ph.D. Michigan '27) took over the instruction in social evolution, rural sociology, and immigration. From time to time during the next ten years other instructors were added to the staff, mainly to help with the introductory course, but occasionally giving courses of their own. Of this number, only Lowell Juilliard Carr ('20, Ph.D. '25) and Robert Cooley Angell ('21, Ph.D. '24) have remained with the department to expand its offerings, the former in the fields of social psychology, public opinion, and juvenile delinquency, the latter in the fields of general theory and social institutions.

During this third period there were in residence as graduate students and instructors men who have since made their

mark either in sociology proper or in social work. In the former category are Professor Read Bain (Willamette '16, Ph.D. Michigan '26), of Miami University, and Walter Abram Terpenning (Kalamazoo '14, Ph.D. Michigan '24), of Albion College; in the latter are Harry Lawrence Lurie ('22, A.M. '23), executive director of the National Council of Jewish Federation and Welfare Funds, and Robert Tucker Lansdale (Oberlin '21, A.M. Columbia '25), of the committee on public administration, Social Science Research Council.

It may seem surprising that so flourishing a field did not come to constitute a separate department before the death of Charles Horton Cooley in 1929. The explanation lies partly in his temperament, and partly in the justice of the treatment which sociology received from the heads of the Department of Economics—Henry Carter Adams, Edmund Ezra Day, and I. Leo Sharfman. Cooley had no taste for administrative work and was only too glad to shift as much of it as possible to the shoulders of someone else. In fact, he argued that it was better to be a part of a strong department than to be an independent weak one. The equality which the staff teaching sociology enjoyed within the Department of Economics is shown by the fact that after the first year's teaching of sociology the heading of the department's offering of courses in the *Calendar* (1895-96) read, "Political Economy and Sociology."

THE DEPARTMENT OF SOCIOLOGY, SINCE 1930.—The last period follows upon the death of Cooley and the selection in 1930 of Roderick Duncan McKenzie ('12 Manitoba, Ph.D. Chicago '16), then of the University of Washington, to become the head of a department of sociology separate from the Department of Economics. Though the department did not become a distinct budgetary unit until 1931-32, to all intents and

TABLE I
NUMBER OF COURSES, NUMBER OF STUDENT ELECTIONS, AND NUMBER OF GRADUATE
STUDENTS SPECIALIZING IN SOCIOLOGY AT TEN-YEAR INTERVALS

Academic Year	Number of Courses Listed	Number of Elections by Students in College of Literature, Science, and Arts	Number of Elections per 100 Students in College of Literature, Science, and Arts	Total Number of Elections from All Schools and Colleges	Number of Graduate Students Specializing in Sociology
1895-96.....	5	116	9.6	....	....
1905- 6.....	8	201	12.8	....	....
1915-16.....	13	531	17.7	604	....
1925-26.....	28	1,374	26.3	1,817	25
1935-36.....	40	2,398	51.0	2,881	64

purposes it started on its separate career in 1930-31. McKenzie brought to the department an interest not theretofore represented—that of human ecology. In addition to a general course in that field, he offered the courses *Population, the City, and Migration and Race Relations*. It was under his direction that the seminar the Metropolitan Community was set up for the holders of Earhart fellowships. This seminar has been continued since the cessation of the Earhart grants. The curriculum of the Department of Sociology has also been enriched by the new courses given by Richard Corbin Fuller ('28, A.M. '30, J.D. '35): *Modern Social Problems, Fields and Methods of Sociology, and Social Legislation*. For a period of two years Clark Tibbitts (Lewis Institute [Chicago] '24) taught courses in social statistics. He left to become a regional director in the United States Government Health Survey, but has since returned as Director of the Institute for Human Adjustment and Lecturer in Sociology.

Perhaps the most striking features of this latest period are the increasing interest in sociology shown by students during the depression, the greater attention given to the integration of curricular offerings, and the increasing emphasis placed upon the development of the graduate work in the department. Also notable has been the adoption of a policy

of bringing distinguished sociologists from other universities to teach for a semester or a summer session. Relations with the University of Chicago have been particularly close, Professors Robert E. Park, Ellsworth Faris, Herbert Blumer, and Louis Wirth all having taught here during the past decade.

Two members of the staff have carried on projects during this period which are of more than usual interest to the people of the state. Since 1934 Lowell J. Carr has been directing the Michigan Juvenile Delinquency Information Service (see Part II: MICHIGAN CHILD GUIDANCE INSTITUTE); Roy H. Holmes has been doing research on the problems of the Michigan farmer through a correspondence technique which has kept him in touch with hundreds of farm families throughout the state.

Beginning in the academic year 1937-38, the professional courses leading to the certificate in social work were taken out of the department and placed in a special curriculum in the Horace H. Rackham School of Graduate Studies. Courses in social problems have continued to be offered in the department, but the professional training constitutes part of the work for the master's degree. This has given the opportunity for a closer integration of the work of the department and increased emphasis on graduate work in pure sociology.

The manner in which the work in sociology has expanded over a period of forty years is roughly indicated in Table I. Also of interest is the growth in the amount of graduate work: In the decade 1904-14 ten master's degrees were obtained in sociology and one doctor's degree; in the next ten years there were two doctor's degrees and thirty-four master's degrees, but between 1924 and 1934, fifteen students specializing in sociology earned the degree of doctor of philosophy, and sixty-six the degree of master of arts.

On May 6, 1940, the University suffered a severe loss through the death of Roderick D. McKenzie, who had been Professor of Sociology since 1930 and Chairman of the Department of Sociology since it became distinct in 1931. The Board of Regents selected Robert Cooley Angell as his successor in the chairmanship.

ROBERT C. ANGELL

SOCIAL WORK

In May, 1921, the Regents of the University authorized the establishment of a curriculum in social work. This was in response to an urgent request from leaders of social work in Detroit that the University undertake to encourage students to enter this field and give them the necessary training. A "curriculum," in terms of University organization, meant a group of courses selected from various departments and so arranged as to constitute a unified program centering about a given subject. It was thus that the courses in business administration were first organized within the Department of Economics. The staff teaching courses in sociology, then within the Department of Economics, was given charge of the curriculum in social work, which covered courses in sociology, economics, political science, psychology, and history. Elementary courses in these fields might be elected as early as the

sophomore year, but the main convergence of the program was upon the junior and senior years, with additional offerings on the graduate level. Besides the courses in the various social sciences there were later added to the curriculum certain professional courses specifically related to social work, such as case work, medical social work, psychiatric social work, and child welfare. A final aspect of these developments was the provision for supervised field work, designed to give students actual contacts with social agencies in Ann Arbor and Detroit, under the direction of a supervisor of field work who joined the staff in 1927. Thus, the three major aspects of education in social work were provided for in the curriculum, viz., background courses in the social sciences, specialized professional courses, and field work.

On the foregoing basis the training program of the University was carried on for a period of fourteen years. Scores of students within this period were graduated to positions with social agencies throughout Michigan and in other states, adding thereby to their academic training actual experience on the job. Many persons who have since become leaders in the profession acquired their initial interest and training through facilities established by the University. In 1927 a certificate in social work was authorized by the Regents, to be granted to those who had added to their academic work in the curriculum a year's experience in a responsible agency under supervision of both the agency and the supervisor of field work on the University staff in charge of the curriculum in social work. This certificate, analogous to that awarded in journalism or nursing, was adopted instead of a specialized degree, which as yet had not been authorized.

Meanwhile, important developments were taking place elsewhere in this new

educational field, emanating largely from leaders and teachers of social work. Even before the University curriculum for the training of social workers was established the Association of Schools of Professional Social Work had been organized. In this association the staffs of the New York School of Social Work and of the Chicago School of Social Service Administration, established by the University of Chicago, took a leading role. Throughout the decade 1920-30 the demand for training in social service had greatly increased, and a large number of schools or curriculums had come into being, both within and outside established educational institutions. Obviously there was a very great need for the authorized expression of educational standards as to types and content of courses and the personnel engaged in giving them. To this task of developing educational standards the Association of Schools of Professional Social Work applied itself. Its efforts were aided by the appearance of such significant monographs as *Education and Training for Social Work*, by James H. Tufts of the University of Chicago, and by the organization of the American Association of Social Workers, a professional group which seeks to do for social work what professional organizations have accomplished in the respective fields of medicine, law, and education. The University of Michigan, by virtue of its curriculum in social work, became eligible for membership in the Association of Schools of Professional Social Work and was admitted in 1925. In 1940 there were thirty schools in this Association, all of them having met the requirements as to courses of instruction and personnel.

For continued membership in the Association of Schools of Professional Social Work it has recently been required that all instruction of a professional or technical character be raised to the

graduate level and preceded by undergraduate work in the social sciences. Consequently, in 1935 the University reorganized its program in this field through the establishment of what was first called the Institute of the Health and Social Sciences, and later, the Institute of Public and Social Administration. The purpose of organizing this new graduate unit has been to correlate the training program in public administration, which has its backgrounds in the Department of Political Science, with the program in social administration, which, as we have seen, was long organized as a curriculum in the Department of Sociology.

In social work a two-year graduate program within the Institute has been established leading to the degree of master of social work. For entrance upon this graduate program the student must have had thirty hours of credit in the social sciences during his undergraduate period. The graduate work is for the most part of strictly professional or technical character. The work is now given entirely in Detroit at the Horace H. Rackham Educational Memorial, on the corner of Woodward Avenue and Farnsworth Street.

In some academic circles these training programs for public and social service are criticized as being outside the field of formal intellectual interests which should, it is held, be the primary concern of our educational institutions. Over against this contention it may be urged that the needs of our democratic civilization are many, not the least of which is the existence of a body of trained personnel in the various fields of public service. The depression has served, as nothing else could, to throw into strong relief the multifarious social problems which must be dealt with sympathetically and expertly if even greater chaos is not to ensue. It would seem as if a democratically sup-

ported state university would be under the necessity of devoting some of its attention and resources to the recruiting and training of students for public service in the field of social work.

ARTHUR E. WOOD

THE EARTHART FOUNDATION

In the autumn of 1930 the Earhart Foundation (a family enterprise established by H. B. Earhart of Ann Arbor) offered the president of the University a sum of money to finance an experiment in the training of a selected group of University students for more intelligent and effective leadership in the affairs of the modern American community. The sum assigned by the foundation was not to exceed \$10,000 annually, and the period of experimentation was set at four years.

The president decided that the Department of Sociology was the logical unit to set up and administer this project. R. D. McKenzie was assigned the position of director of the enterprise by the president and the Board of Regents.

The plan of operation proposed and followed throughout the four-year period was as follows: a limited number (from eight to twelve) of advanced graduate students from the various social science disciplines were chosen each year on the basis of scholarship and personality, and were awarded fellowships in the Graduate School, each bearing a stipend of \$500 for the academic year. In addition, a somewhat larger number (from twenty-five to thirty) of selected undergraduate students, most of them in their senior year, were awarded scholarships averaging around \$100 for the academic year. Both fellows and scholars thus selected were required to devote a stipulated minimum amount of time each week to the investigation of some community problem in the field, primarily in the Detroit metropolitan region. The prob-

lems selected were carefully chosen, and the scholars, for the most part, worked under the field guidance of the fellows. Two seminars, each meeting for a two-hour period once a week, were set up, one for the fellows and one for the scholars. The two seminars were closely interrelated. The scholars working under the direction of a particular fellow always attended the senior seminar when the fellow in question reported on his work, and frequently the fellows made reports in the junior seminar.

One feature of these seminars was rather unique; namely, the participation in them by members from the various social science departments and also by invited persons from the outside community. As each student reported in the seminar, those most closely associated with his research project, both professors and outsiders, attended the seminar and took part in the discussion. This, together with the fact that the student members of the seminar represented different social science disciplines, and were engaged in the study of different types of community problems, made for a cross-fertilization of ideas and for a broader perspective of the interrelationships of human activities in our modern social order. It tended to break down the narrow academic divisions which characterize university specialization and to focus attention upon the interrelationships of social phenomena.

The period of this experiment terminated at the close of the academic year 1934-35, but in recognition of the value of this type of activity, the University has continued the project, though on a somewhat more limited scale, by setting aside a number of specially designated fellowships in the Graduate School to be awarded to students selected for this work.

Aside from the student-training feature of this work, which, of course,

was the main objective, a considerable amount of research material has been collected which is made available to interested parties and which, when am-

plified and interpreted, will be presented in published form.

RODERICK D. MCKENZIE*

* Died May 6, 1940.

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THE DEPARTMENT OF SPEECH

THE University of Michigan is unique in the development of instruction in the field of speech. The first credit-bearing course in speech in any of the leading universities was given at Michigan, and the first separate speech department in any of the large universities was also established at this institution. And, carrying on the tradition of distinction, the University has at present one of the largest and most complete departments of speech in the United States.

The organization of the Department of Speech and its early development were largely the result of the ability and inspiration of Thomas Clarkson Trueblood (A.M. Earlham '86, Litt.D. *ibid.* '21) and his three early associates: Richard D. T. Hollister, Ray K. Immel, and Louis M. Eich.

Trueblood came to the University in 1884 to give a six-week course of lectures. For this innovation the University provided classrooms and other equipment,

but the students were required to pay a tuition fee and to take the work without academic credit.

Returning in 1885-86, Trueblood found even greater interest in the study of speech, an interest which culminated in the presentation to the dean of the Department of Law of a petition by most of the law students for free tuition and a longer term of instruction. When it was found that Trueblood could arrange his engagements in other universities accordingly, Angell presented the petition to the Regents and recommended the inauguration of a ten-week course, the instructor to be a member of the University faculty for that period at least. This request was granted, and the longer course was made available.

Finally, upon the insistence of the students in the Department of Literature, Science, and the Arts, a credit course for one semester was made available. The establishment of this course was a new educational venture, for at that time

no college or university in the United States offered credit for work in speech. In the second semester of 1887-88 Trueblood was given the title of Assistant Professor of Elocution and Oratory in the Department of English. This arrangement was continued for the next two years, Trueblood relinquishing some of his other lectureships and also combining his courses at Ohio Wesleyan into the first semester of each year.

In 1889, college work in speech was extended to the full year, and Trueblood devoted his entire time to the University of Michigan. So successful was the development of new courses to meet the demands of all classes of students in both the Law and the Literary Departments that in 1892 a Department of Elocution and Oratory was created and the chairman was granted a full professorship. By this step, the University of Michigan created the first separate department and also the first professorship in speech in any of the large universities in the United States.

For the next eleven years, or until the end of 1903, the courses in elocution and oratory were handled entirely by Professor Trueblood. Soon, however, the enrollment became so heavy that assistance was needed, and in 1904 an instructor was added. In 1909, two more persons were added to the staff; others were added in 1914 and thereafter, until, at the time of Professor Trueblood's retirement in 1926, the departmental personnel consisted of nine members. Since that time it has continued its rapid growth; at present there are fifteen full-time staff members and an equal number of teaching fellows and assistants.

During the nearly fifty years of its existence (to 1940), the department has had several titles: Department of Elocution and Oratory, 1892-1908; Department of Oratory, 1908-19; Department of Public Speaking, 1919-27; Depart-

ment of Speech, 1927-32; Department of Speech, Phonetics, and General Linguistics, 1932; Department of Speech and General Linguistics, 1932-39; and Department of Speech, since 1939.

In the years since Professor Trueblood's retirement the department has been under the chairmanship of three persons. Professor James Milton O'Neill (Dartmouth '07), who came to Michigan from the chairmanship of the Department of Speech at the University of Wisconsin, served from 1927 to 1932. Henry Arthur Sanders ('90, Ph.D. Munich '97), for many years a member of the faculty and now Professor Emeritus of Latin, served from 1932 until his retirement in 1939. Since that time Professor Gail Ernest Densmore ('22, A.M. '24), who joined the staff of the department in 1922, has been Chairman.

In addition to the departmental chairmen, the following persons of University Senate rank have been appointed to the staff, in the order indicated: Richard Dennis Teall Hollister ('02, Ph.D. '36); Ray Keeslar Immel (Albion '10, Ph.D. Michigan '31), now dean of the School of Speech at the University of Southern California; Louis Michael Eich ('12, Ph.D. '23), also secretary of the Summer Session; Carl Gunard Brandt ('21, LL.M. '22), also Chairman of the Department of Engineering English in the College of Engineering and Director of Student-Alumni Relations; John Henry Muyskens ('13, Sc.D. '25); Valentine Barthold Windt (Cornell '21, A.M. Princeton '22), also Director of Play Production; Henry Michael Moser (Ohio State '24, Ph.D. Iowa '37), also academic counselor in the College of Literature, Science, and the Arts; Clarence Linton Meader ('91, Ph.D. '00), now Professor Emeritus; Waldo Mack Abbot ('11, '13), also Director of the Broadcasting Service; Henry Harlan Bloomer (Illinois '30, Ph.D. Michigan '35), also manager of

the Speech Clinic in the Institute for Human Adjustment; William Perdue Halstead (Indiana '27, Ph.D. Michigan '35); Kenneth Gordon Hance (Olivet '24, Ph.D. Michigan '37); David Owen (Leland Stanford '23); and Ollie Lucy Backus ('29, Ph.D. Wisconsin '33).

During the years from 1892 to the present, the department has extensively broadened its curricular and extracurricular work from its original offerings in public speaking and interpretation. In particular, instruction has been added and developed in play production, speech science, and radio.

From 1892 to 1915, the courses in Shakespearean reading and interpretative reading constituted the only work in both interpretation and dramatics. Occasionally plays would be presented informally in connection with these courses, but it was not until 1915 that a course entitled Play Production was organized. In 1916 the first public play under the auspices of the department was presented, thus beginning a long and successful program in play production which has continued to the present time. This performance of Charles Rann Kennedy's *The Servant in the House* was presented in University Hall before a set of curtains and without special lighting effects or stage equipment.

The growth of interest in play production, however, was rapid. Courses were extended from a single course in 1915 to six courses in 1922, and to eight in 1926, with more than one hundred fifty students enrolled each semester. In 1927 the scenic aspects of production were expanded, and with the removal of the work in play production to the Mimes Theater in 1928 there was undertaken a more elaborate and finished mounting of plays with better staging and lighting facilities. Through successive directorships of play production, the program has been expanded, with improved facilities and an

increasing number of students, until at present seven or eight plays are presented during each academic year and an equal number during the summer session. The former Mimes Theater, now called the Laboratory Theater, is used for some classes and the workshops; and the public performances are presented in the Lydia Mendelssohn Theater. So great has been the public's response to the offerings of the play production classes that from four to seven performances of each play are necessary.

Work in speech science was first offered by the department in 1926, with courses in phonetics and biolinguistics.¹ Expanding from limited beginnings to more than twelve courses requiring the services of four members of the staff, this field developed rapidly to the point where, in 1937, a fully equipped and fully staffed speech clinic was opened. This clinic, which is operated in conjunction with the Institute for Human Adjustment, now includes a staff of fifteen persons and handles more than four hundred cases annually (see Part VI: INSTITUTE FOR HUMAN ADJUSTMENT).

Through the co-operation of the Institute for Human Adjustment, the Medical School, and the School of Dentistry, the department has been able to provide distinctive opportunities to students in speech science. Not only the traditional courses in phonetics, voice science, and

¹ Instruction in linguistics, phonetics, and philology in the University was developed mainly in connection with the history and pronunciation of particular languages. In 1906 several general philology and linguistics courses previously announced in the *Calendar* with Sanskrit and English philology were grouped together as general linguistics and comparative philology, but other more specific courses continued to be listed with courses in German. Instruction in general linguistics was fostered chiefly by a member of the Latin staff, Clarence L. Meader, who also, for many years, taught Sanskrit, Russian, and even (1911-21) Old Bulgarian. Sanskrit was dropped in 1931, but Russian, begun in 1908, is still given, and the work in that field now constitutes, in effect, a separate department. In 1932 the work in general linguistics and phonetics, under the direction of Professor Meader, was incorporated with that of the Department of Speech.

speech correction, but also specialized courses in the anatomy and physiology of the organs of speech, courses in clinical methods, and work in connection with the Department of Pediatrics and the University Hospital are available.

Similarly, the work in the field of radio has developed rapidly under the direction of the Department of Speech. In 1934 a specialist in this field was added to the staff of the department, and facilities in Morris Hall were made available for classroom work and broadcasting (see Part II: BROADCASTING SERVICE). Shortly thereafter, arrangements were made with commercial broadcasting stations in Detroit and Pontiac for allotments of time; and the University has since been "on the air" each day of the academic year and the summer session.

The course offerings in radio have increased from one in 1934 to seven at the present time, with a corresponding increase in the number of programs planned, directed, and produced under the auspices of the department. Each semester approximately one hundred and fifty students elect courses in this field, which prepares candidates for positions in commercial broadcasting as well as in educational radio.

The developments in these fields of dramatics, speech science, and radio, as well as similar developments in the original fields of public speaking and interpretation, and the number of students enrolled, have necessitated a significant increase in the total number of staff members and the breadth of the work done. At present the more than thirty staff members offer approximately seventy courses leading to the bachelor of arts, the master of arts, and the doctor of philosophy degrees. The courses are designed to provide abundant opportunities for the development of personal proficiency in speech, as well as to convey a body of information useful not only to

teachers but also to clinical practitioners.

In addition, the department sponsors a wide array of extracurricular activities in various fields. Schedules in debating and oratory are developed in conjunction with the Western Conference Debate League and the Northern Oratorical League, and each year approximately thirty students represent the University in various forensic events. As previously mentioned, the extracurricular work in dramatics consists of a winter and a summer season presented by the classes in play production.

The physical equipment of the department has evolved extensively from the one classroom used by Professor Trueblood for his classes in 1884. The present facilities include not only a number of classrooms in Angell Hall and Mason Hall but also the Laboratory Theater, a broadcasting studio with ample electrical and mechanical equipment, a phonetics laboratory, and a complete speech clinic. In addition, the Department of Speech has the use of the Lydia Mendelssohn Theater for all of its public dramatic performances.

During its approximately fifty years the Speech Department has been instrumental in the establishment of a number of associations and leagues, many of which are active at the present time. In 1890 the Oratorical Association was organized for the purpose of co-operating with like organizations of other Midwestern universities to sponsor debate and oratorical contests. In the Northern Oratorical League, also organized at Michigan in 1890, were the universities of Chicago, Iowa, Michigan, Minnesota, Northwestern, and Wisconsin, and later Oberlin College, the University of Illinois, and Western Reserve University; this association has continued with only slight changes in membership until the present day.

Several debating leagues have also

been organized by the Department of Speech (see Part IX: DEBATING). In 1893, an association including Michigan, Chicago, Northwestern, and Wisconsin was created. A few years later the Central Debating League was formed, and the Mid-West League was organized in 1915. Shortly thereafter the department, in co-operation with the Extension Division of the University, formed the Michigan High School Debating League, which is recognized as one of the outstanding organizations of its kind in the United States. For women debaters the Michigan-Ohio-Indiana League was created in 1922, and in December, 1923, there was secured for the University of Michigan an endowment of \$8,000 from Mrs. Eleanor Clay Ford, to provide testimonials and gold medals annually for each of a selected number of Michigan women participating in intercollegiate debates.

Probably the largest organization created through the co-operation of the Department of Speech is Delta Sigma Rho, a national honorary forensic society with seventy-one chapters and more than ten thousand members at the present time. Not only was the University of Michigan one of the eight leading universities of the country to be charter members, but Professor Trueblood was one of the founders of the society and served as the chairman of the organization meeting held at Chicago in 1906.

Finally, the Oratorical Association Lecture Course, which had been functioning as a Student Lecture Association for several years, was placed under the sponsorship of the department in 1911 (see Part IX: ORATORICAL ASSOCIATION LECTURE COURSE). Professor Trueblood was chairman of the committee until the time of his retirement in 1926, and since that time a member of the Department of Speech has served in a similar capacity. During its years of management,

the Association has presented such famous persons in the field of public affairs as William Jennings Bryan, William Howard Taft, Newton D. Baker, Winston Churchill, William E. Borah, Ruth Bryan Owen, and Albert J. Beveridge. In the field of literature and the theater, such personalities as John Galsworthy, John Drinkwater, Irvin S. Cobb, Alexander Woolcott, Cornelia Otis Skinner, Gilbert K. Chesterton, William Butler Yeats, Thomas Mann, and Edna St. Vincent Millay have appeared. In the field of exploration and travel almost every famous explorer of recent years—including Vilhjalmur Stefansson, Donald MacMillan, Carl Akeley, Roald Amundsen, Richard E. Byrd, Fridtjof Nansen, William Beebe, and Martin and Osa Johnson—has also been scheduled.

This Oratorical Association is one of the oldest institutions on the University of Michigan campus, is perhaps the oldest of such organizations in the country, and, throughout its long career, has been recognized as outstanding.

The summer of 1940 witnessed the establishment by the Department of Speech of a campus organization which promises to contribute much to the entire University as well as to the one field. This is the annual speech conference, conducted each summer, which makes available to all departments in the institution demonstrations and lectures in public speaking, debating, interpretation, the drama, radio, and speech correction. Each year one or more nationally prominent persons in the field of speech are to be brought to the campus for the speech conference, and the lectures and demonstrations conducted by these authorities will extend the usefulness of the department beyond the boundaries of its courses and of the contributions of its staff members.

The first university department of speech in the United States has evolved

greatly from the one-person staff in 1884 to the more than thirty person staff in 1940 and from the work in elocution to that in five widely diversified fields—that is, from an undergraduate curriculum in platform arts alone to one designed to develop both graduates and undergraduates in public speaking, inter-

pretation, drama, radio, and speech science. Throughout these years, not only has it grown within the University of Michigan, but also it has maintained its place as one of the strong departments of speech in the leading universities of the United States.

KENNETH G. HANCE

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THE DEPARTMENT OF ZOOLOGY

INDICATIVE of the generally greater esteem in which the sciences have been held in the Middle West as compared with their status in institutions of the East, provision was made for the study of botany and zoology from the very beginning of the University of Michigan in Ann Arbor. That these subjects were to be well taught was made evident in the first appointment to the faculty, that of the immortal Asa Gray (M.D. Coll. of Physicians and Surgeons [West. Dist., N.Y.] '31, A.M. Harvard '44, LL.D. Michigan '87), whose compendium on taxonomic botany has been standard for many decades (see Part III: DEPARTMENT OF BOTANY). On July 17, 1838, the Regents adopted the following resolution (*R.P.*, 1837-64, p. 50): "Resolved, That Dr. Asa Gray be and he is hereby appointed Professor of Botany and Zoology in the University of Michigan, and that the committee on Professorships be instructed to correspond with Dr. Gray in detail relative to his

appointment." His salary was to be \$1,500.

Gray, whose doctorate was in medicine, not philosophy, did not, however, come to Ann Arbor. He was given leave of absence for a year to travel in Europe, was paid his stipulated salary to defray the expenses of the trip, and was asked to purchase books for the University library while abroad, to cost not more than \$5,000. Even the following year (1839-40), Professor Gray did not come to the University, for it was not until the autumn of 1841 that the buildings and staff were ready for students in Ann Arbor. In April, 1840, Gray was asked to agree to a suspension of his salary for the second half of the school year, and assented. In the Regents' annual report of December 31, 1840, he was listed as Professor of Botany and Zoology in the Central Institute of the University at Ann Arbor, but he was not actually in residence. The only other faculty position similarly listed was that of Douglass

Houghton as Professor of Mineralogy and Geology. Houghton was also state geologist, and received his salary in that capacity, but Asa Gray received no compensation. Although his professorship formally continued through the year 1841-42, it was still without service, residence, or salary. In May, 1842, he resigned to accept an appointment at Harvard College. Thus ends the first chapter of the history of zoology at the University of Michigan. The reasons for its hesitant start are well outlined by the resolution adopted by the Regents on Gray's resignation, namely, to accept the resignation, expressing regrets that the unavoidable delay in opening the University and the embarrassed condition of the finances for the last two years had occasioned the loss of the services of a gentleman whose qualifications were highly estimated.

The professorship of botany and zoology promptly went to Abram Sager (Rensselaer '31, M.D. Castleton Medical College '35, A.M. hon. Michigan '52), who like Asa Gray was a doctor of medicine. Sager seems not to have given the junior zoology course announced for the three autumn terms 1843-45, but was present in the summer term of 1845 and intermittently thereafter. Apparently, though he was urged to stay, he contemplated leaving the faculty in the fall of 1845, when the professorship of botany and zoology was added to that of chemistry, mineralogy, and geology, held by Douglass Houghton. Houghton was drowned in Lake Superior before he could assume his multiple duties, and Dr. Sager was again invited to serve during the following spring term. He declined, since he was practicing medicine in Jackson and did not wish to interrupt this private work for so short an engagement at so small a compensation. "As the Committee did not consider the subject of sufficient impor-

tance no other gentleman was engaged."

Sager was retained on the staff, at least by title, though with comparatively little teaching. In January, 1848, he was given a second position, that of Professor of the Theory and Practice of Medicine in the newly organized Department of Medicine and Surgery, and in July of that year a third position, that of University Librarian. His medical title was changed in January, 1850, to Professor of Obstetrics and Diseases of Women and Children, and later that year he was elected to the presidency of the medical faculty. In 1854 his medical title was again changed to that of Professor of Obstetrics and Physiology. All this time Dr. Sager was still Professor of Botany and Zoology and served as such in intermittent fashion. His medical work apparently claimed more and more of his time, however, and in March, 1855, he asked to be relieved of his duties in the Department of Literature, Science, and the Arts, but retained his position in the Department of Medicine and Surgery.

Succeeding to the work in biology in 1855 was Alexander Winchell (Wesleyan '47, LL.D. *ibid.* '67), who became Professor of Geology, Zoology, and Botany. He came to this position from the chair of physics and civil engineering. In 1859 he became also state geologist. Under Winchell the college work in zoology promptly expanded, as is more especially noted later in connection with the curriculum. Under him also the development of the Museum appears to have started, with the appointment in 1863 of Carl Rominger, M.D., as Assistant Curator of the Museum of Natural History (see Part VIII: UNIVERSITY MUSEUMS). Though a taxidermist had been employed ten years earlier under Sager, on a piecework basis, Rominger was apparently the first on annual appointment.

Winchell remained for many years, and from 1868 Mark Walrod Harrington

('68, A.M. '71, LL.D. '94) was associated with him in the Museum as Assistant Curator. In 1873 Winchell resigned to become the chancellor of Syracuse University and was succeeded by Eugene Woldemar Hilgard (Ph.D. Heidelberg '53, LL.D. Michigan '87), to whose professorship mineralogy was added in 1874.

Hilgard remained only two years, then resigned to accept a position in the University of California. Under him for the first time there appeared more than two names on the roster of the staff of the department. Mark Harrington was promoted to an assistant professorship, and there were two assistants in the Museum. Harrington's position at first was in geology, zoology, and botany, but in 1874 it was narrowed by the omission of geology. When Hilgard left in 1875 Harrington was put in charge of zoology and botany, and never again was geology (except as paleontology) included with biology as the appointed field of any one member of the faculty (see Part III: DEPARTMENT OF BOTANY AND DEPARTMENT OF GEOLOGY).

Joseph Beal Steere ('68, '70, Ph.D. hon. '75) joined the department in 1876 as Assistant Professor of Paleontology and Curator of the Museum, and Volney Morgan Spalding ('73, Ph.D. Leipzig '94) came the same year as Instructor in Zoology and Botany. In 1879 zoology was separated from both botany and paleontology; Spalding's title was thereupon changed to Assistant Professor of Botany and Steere's to Professor of Zoology and Curator of the Museum; at the same time, Winchell returned to a chair of geology and paleontology. Thereafter, until 1885, only Steere's name and that of an assistant in the Museum appeared in connection with work in zoology.

In that year Howard Ayers joined the staff of the Department of Zoology for one year. He was succeeded by Jacob Ellsworth Reighard ('82, Sc.D. hon. '36),

who continued many years. Others who were added to the faculty with the rank of instructor or higher were the following: Frederic Leonard Washburn (Harvard '82), 1887-88; Louis Murbach ('89, B.S.[Bio.] '90, Ph.D. Leipzig '94), 1891-93; Henry Baldwin Ward (Williams '85, Ph.D. Harvard '92, Sc.D. Cincinnati '20), 1892-93; and Dean Conant Worcester ('89, Sc.D. hon. '14), 1893-98.

Steere resigned in 1894, and Reighard, who had become Professor of Animal Morphology in 1892, took charge of the department. In 1895 he was officially designated as Professor of Zoology and Director of the Zoological Laboratory and Museum, and he continued as head of the Department of Zoology until 1925. Of the many new members added to the faculty of the department in this period, those who held the rank of instructor or higher included the following: Charles Atwood Kofoed (Oberlin '90, Sc.D. hon. *ibid.* '15, Ph.D. Harvard '94), 1894-95; Frank Rattray Lillie (Toronto '91, Ph.D. Chicago '94), 1894-99; John Black Johnston ('93, Ph.D. '99), 1897-99; Fanny Elizabeth Langdon ('96, M.S. '97), 1898-99; Herbert Spencer Jennings ('93, Ph.D. Harvard '96), 1899-1903; Samuel Jackson Holmes (California '93, Ph.D. Chicago '97), 1899-1905; Karl Wilhelm Genthe (Ph.D. Leipzig '97), 1899-1901; Raymond Pearl (Dartmouth '99, Sc.D. *ibid.* '19, Ph.D. Michigan '02), 1902-6; James Edwin Duerden (Ph.D. Johns Hopkins '00), 1903-5; Dana Brackenridge Casteel (Allegheny '99, Ph.D. Pennsylvania '03), 1905-9; Otto Charles Glaser (Johns Hopkins '00, Ph.D. *ibid.* '04), 1905-18; Horatio Hackett Newman (McMaster [Toronto] '96, Sc.D. *ibid.* '33, Ph.D. Chicago '05), 1905-8; Arthur Sperry Pearce (Nebraska '00, Ph.D. Harvard '08), 1908-11; Robert William Hegner (Chicago '03, Ph.D. Wisconsin '08), 1908-17; J. Frank Daniel, 1909-10; Peter Olaus Okkelberg

(Minnesota '06, Ph.D. Michigan '18), 1910—; Aaron Franklin Shull ('08, Ph.D. Columbia '11), April, 1911—; George Rogers La Rue (Doane '07, Ph.D. Illinois '11), 1911—; George Edwin Johnson (Dakota Wesleyan '13, M.S. Chicago '16), 1917–18; Paul Smith Welch (James Millikin '10, Ph.D. Illinois '13), 1918—; Lewis Victor Heilbrunn (Cornell '11, Ph.D. Chicago '14), 1919–29; Lloyd Evans Thatcher (Missouri '11), 1919–24; Frank Nelson Blanchard (Tufts '13, Ph.D. Michigan '19), 1919–37; Harry Thomas Folger (Indiana '17, Ph.D. Johns Hopkins '22), 1922–29; Amos Henry Hersh (Franklin and Marshall '14, Ph.D. Illinois '22), 1922–23; Carl Olaf Carlson (A.M. Columbia '18), 1924–25; and Arthur E. Woodhead (Clark '14, Ph.D. Michigan '28), 1924—.

In the Museum, still connected during part of this time with the department, positions which were substantially equivalent to instructorships, but without teaching duties at first, were filled by: Herbert Edward Sargent, beginning in 1898; Charles Christopher Adams, 1903; and Alexander Grant Ruthven (Morningside '03, Ph.D. Michigan '06), 1906. Adams was made Instructor shortly after his service began, and he gave one course in the department. Dr. Ruthven had the rank of an instructor from the first, gave one course during his second year, and was designated Instructor in Zoology as well as Curator of the Museum in 1908. After that time he regularly gave instruction and remained a member of the teaching department, although the Museum was given wholly separate organization in 1909.

Professor Reighard withdrew from the chairmanship in 1925, and retired in 1927. The executive position in the department has been since 1925 successively held by A. Franklin Shull (two years), Alexander G. Ruthven (two years), Peter O. Okkelberg (four years),

and George R. La Rue. More staff members were added during this period—Arthur M. Chickering, 1925–26; Melville H. Hatch, 1925–26; Theodore C. Byerley, 1926–28; Frank Egbert Eggleton (Hillsdale '22, Ph.D. Michigan '30), 1926—; Horace Wenger Feldman (Purdue '21, Sc.D. Harvard '25), 1927–29; Gordon Lynn Walls (B.S.Eng. Tufts '26, Sc.D. Michigan '31), 1927–31; Harry Wilbur Hann (Indiana '17, Ph.D. Michigan '26), 1928—; Alfred Henry Stockard (Wyoming '25, Ph.D. Michigan '32), 1928—; Wendell Henry Krull (Upper Iowa University '21, Ph.D. Michigan '31), 1928–29; and Alvalyn Eunice Woodward (Rochester '05, Ph.D. Michigan '18), 1929—. Omitted from these lists are names of recognizedly temporary appointees—in the classification of well advanced students doing graduate work, then called instructors (on a part-time basis) but now called teaching fellows. Names not followed by a definite term of service are those of the present staff.

The considerable number of those named in the preceding paragraphs who were at the University only a few years gives point to the comment made long ago that the University of Michigan was preparing the faculties of other universities for them. Among the institutions to receive zoologists directly or indirectly from the University of Michigan are Amherst College and the following universities: California, Chicago, Minnesota, Pennsylvania, Wisconsin, Maine, Texas, Washington, Iowa, Johns Hopkins, and Western Reserve.

THE ZOOLOGY CURRICULUM.—When the department consisted of one man, and only a few courses could be given, the nature of the offerings fluctuated considerably over a period of years, for the courses reflected the faculty's training and interest. Had Asa Gray ever taught at the University, it is cer-

tain that systematic botany would have received a large share of attention. Dr. Sager's courses were scattered in time, and there are few descriptions of them to indicate their content. A junior course was announced for the three fall terms before 1846 but probably not given. He taught biology in the summers of 1845, 1847, and 1848. After that time both zoology and botany were scheduled for the third term of the freshman year, again without description. In the 1852-53 *Catalogue* is given the first inkling of the nature of any course: seniors were given "the general and comparative physiology of animals, their classification, habits, and relation to human interests." In 1845 the Regents had considerably allowed the faculty to choose books to accompany the course in zoology; the texts selected, as specified in the 1852-53 *Catalogue*, were Agassiz and Gould's *Zoology* and Edward's *Cours de zoologie*. In 1852-53 an agricultural course was planned (though it was probably never given) and was described as follows: "Lectures on Animal and Vegetable Physiology, and Physiology in general, Physiology and diseases of domestic animals in particular, and the structure and habits of insects, in relation to grains, trees and horticultural plants."

With the advent of Alexander Winchell in 1855 the zoology curriculum expanded, and so did the descriptions of courses. Seniors were required in the first semester to take a course which was described at length in the *Catalogue* as involving the "organization of . . . animals as the basis of their systematic classification; . . . physiology, comprising . . . sources and modes of nutrition, . . . development and dissemination; . . . geographical distribution and economical history." Laboratory work was available at choice: "Besides the instruction of the lecture room, the professor will afford facilities for those who

desire them, for the more careful and minute examination and study of objects, and the determination of species." Vacations were wisely used: "Short excursions will be undertaken in term times, and longer ones in vacation for the purpose of bringing students into actual and direct communication with nature."

In Winchell's second year the required course was shifted to the junior year, and seniors might elect the flexible three- or six-day, one- or two-semester course, Comparative Anatomy and Physiology and the Principles of Classification in the Animal Kingdom. It consisted of lectures "amply illustrated by a complete suite of the birds which visit Michigan and a collection of 2,000 species of shells, . . . and means unsurpassed for microscopical observations." The student, the *Catalogue* said, "is accompanied on frequent excursions into the neighborhood, and such as desire it are permitted to engage in investigations under the eye of the Professor, in the Laboratory attached to this department." To the textbooks and references announced in Sager's time were added: Agassiz, Gould, and Perty, *Lehrbuch der Zoologie*; Woodward, *Recent and Fossil Shells*; Carpenter, *General and Comparative Physiology*; and a year later, Owen, *Vertebrate Skeleton and Teeth*.

In 1862-63 and thereafter Professor Winchell offered, for candidates for the master's degree, a course of lectures known as the Vertebrate Skeleton—Its Morphology and Homologies. In 1874-75 a Polytechnic School was organized as a part of the Department of Literature, Science, and the Arts—which then included the work in pharmacy, as well as in engineering—to administer advanced courses in the mathematical, physical, and natural sciences and their applications to the arts. The Department of Literature, Science, and the Arts required that juniors in the scientific

course "pursue a course in structural and physiological zoology, with a free use of the microscope, diagrams, magic-lantern slides, and specimens from the Museum." The effect of combining in one chair the fields of geology and zoology is evident in the following statement: "The elective course of the Senior year is a course in systematic zoology as a preparation for geology." The textbooks in zoology were "Nicholson's series." In the Polytechnic School: "A special course in Zoology runs through the whole year. During the first semester the student pursues Comparative Anatomy and Physiology . . . In the second semester Anatomy and Physiology are completed, and a class of animals is selected and their classification studied."

The first biology course was given in 1875, when Assistant Professor Harrington combined plants and animals in one presentation, which was announced as follows (*Cal.*, 1875-76, pp. 43-44):

The members of the Scientific and of the Latin and Scientific Sections of the Junior Class can elect a course in Biology . . . [in] the first semester. It consists of the study of as many typical forms of animals and plants as can be considered in the time allotted . . . The text-book . . . is McGinley's *Biology*. . . .

In the second semester of the Junior year, the members of the Scientific Section are required to take a course . . . in Embryology. The development of the chick in the hen's egg will be followed in detail, microscopically and otherwise. The text-book . . . will be Foster and Balfour's *Elements of Embryology*, Part I.

An elective course for seniors, Paleontology, was offered. Comparative Anatomy and Physiology, followed by Systematic Zoology, were available in the Polytechnic School, and advanced students had an opportunity to do some work in histology (mostly human).

Embryology was omitted when Steere

took charge of the department in 1877, but was restored five years later. Emphasis was put upon comparative anatomy and classification. Insects and mollusks were favored as material for classification, for the separate courses Entomology (1879) and Conchology (1880) were introduced. Histology, with Physics and Chemistry as prerequisites, was offered to zoology students, but by a Medical Department professor.

Professor Reighard joined the faculty in 1886. A year later the elementary course again became a biology course, this time given jointly by a botanist and a zoologist, an arrangement which continued until 1916. In 1889 the work in zoology was divided into General Zoology, taught by Steere, and Animal Morphology, given by Reighard. This separation was made more complete in 1892 by the formation of distinct departments, Steere becoming Professor of Systematic Zoology and Reighard Professor of Animal Morphology. In the Department of Animal Morphology were the courses Invertebrate Morphology, Mammalian Anatomy, Comparative Anatomy of Vertebrates, and Embryology. Histology, though offered to zoology students, was largely provided by the Department of Medicine and Surgery. A journal club and field club were established and flourished many years.

With the resignation of Professor Steere in 1894, the Department of Systematic Zoology suffered a decline. Two years later the whole curriculum in zoology underwent reorganization. Invertebrate zoology was expanded; a separate course in evolution was introduced; the work in embryology included a course on the mechanism of development which had begun under Kofoid in 1894 with the title the Animal Egg, but which was now changed, first to Physiological Morphology, then to Experimental Morphology; and a course entitled Morphology and

Development of the Frog was made prerequisite to Comparative Anatomy of the Vertebrates. Courses in entomology and parasitology were added temporarily in 1899 to fit the interests of a new member of the staff. To help with the work of the laboratory there was created among the students a corps of voluntary assistants, who, in return for their service, received credit in teacher training.

Because of the multiplicity of courses given since 1900—introduced partly in recognition of the expansion of the subject and partly in response to demand from other units of the University or because of changes in secondary schools—a strict adherence to chronological order becomes confusing, and the developments are better followed by subjects.

As to physiology, the first course definitely in this field was established as Physiological Zoology in 1901, though Holmes's course of the year before, Animal Behavior, was largely physiology. Physiological Zoology was divided into two courses in 1915, under Glaser, but with his resignation in 1918 these were changed to Physiology and Mammalian Anatomy, with Okkelberg in charge. When Heilbrunn came General Physiology was resurrected, and both this and Mammalian Anatomy and Physiology, as well as the Seminar in Physiology, were offered. Physiology was dropped in 1928, but restored in 1930 as Comparative Physiology under Woodward.

Natural history, aside from the field work included in a number of courses, had its first recognition in the ecology course given by Adams in 1903. Ecology was taken over later by Dr. Ruthven and its subject matter was partly included in his course Zoogeography after 1909. Fresh-Water Biology was started by Pearse in 1908, was taken over by Shull in 1911, and was incorporated in Reighard's Natural History of Invertebrates in 1916. The latter course went to

Blanchard in 1925 with the more inclusive title Natural History of Animals, but a year later Fresh-Water Biology was made a separate course, whereas the natural history course concerned only the vertebrates. Fresh-Water Biology was finally abandoned in 1928 in favor of the related Limnology, by Welch. Ornithology became a separate course in 1930-31, first given by Blanchard, later by Hann.

Genetics was represented only in the experimental morphology course until 1904, when Pearl offered the lecture course called Heredity. This course was taken over by Newman in 1906, by Glaser in 1909, and by Shull in 1919. Genetics, a more advanced, one-semester lecture course given by Shull, was first scheduled in 1911. In 1916 a second semester, including laboratory work, was offered, but it was discontinued in 1919. For some years thereafter Genetics was given co-operatively by the Department of Botany (represented by Professor H. H. Bartlett) and the Department of Zoology, but this plan was discontinued in 1927. There was an expansion of the work in genetics during President Little's administration, but no additional course was offered. Feldman gave Genetics in 1927-28, with laboratory work, and Shull took it over in 1929-30. From then until 1932 the work covered the entire year, but since that date it has occupied only the first semester.

Biometry was represented by a course entitled Statistical Zoology, by Pearl, from 1902 to 1906. Thereafter it was omitted—except as a part of Genetics when the latter course was given jointly by the Departments of Botany and Zoology throughout the year—until 1932. At that time a course called Quantitative Biology was started by Shull.

Embryology was a standard course during all this period, sometimes branching out into its genetic implications, as in

Holmes's Morphogenesis in 1904. The main course was given by Glaser in 1905, and has been given by Okkelberg since 1918. Entomology was revived when Hegner came to the University, was variously subdivided by him, and was then contracted to a single course under Welch in 1917; finally, it was supplemented by Insect Morphology and Insect Histology, in 1928. Cytology was begun by Hegner under the title Cellular Biology in 1913, was discontinued when he left the University in 1917, and was partially restored in 1928 by Okkelberg along with Histology and Microtechnique. Comparative Anatomy was given by Reighard until 1916, then was turned over to Okkelberg, and, finally, was turned over to Stockard, in 1933. Parasitology was first given by George R. La Rue in 1914-15, Helminthology was added in 1928-29, and the related Protozoology was first given as a separate course in 1931-32 by Assistant Professor Woodhead with the co-operation of Assistant Professor O'Roke of the School of Forestry and Conservation. Fishes were treated in a separate course as early as 1904 in Fish and Fisheries of Michigan, by Reighard; this was changed to Fish and Game of Michigan, for forestry students, in 1909; and, finally, Elementary Ichthyology was given in 1930-31 by John Richard Greeley of the Museum staff. Evolution, long given by Reighard as a one-hour lecture course in the evening, was expanded to two hours and was given in the morning; then in 1925 it was turned over to Shull.

The training of teachers and of other professional biologists began with the corps of voluntary assistants under Holmes, as already mentioned (p. 744). In 1909-10 this work was expanded into Comparative Histology (still largely technique), in the first semester, and Zoology for Teachers, in the second. When Histology was revived in 1928-29

the laboratory-methods course was reduced to one semester. Educational methods have been dealt with in Biology for Teachers, given co-operatively for a number of years by George R. La Rue, of the Department of Zoology, and Felix G. Gustafson, of the Department of Botany. Museum Methods, given by Ruthven and various members of the Museum staff since 1918, provided training for museum workers.

Several attempts to reach students not specializing in biology have been made from time to time. In a sense, the courses Evolution and Heredity belong here, but they are intended for biologists also. In 1906 a course called Short Course in Zoology was offered to forestry students, but it was open also to others. This became Economic Zoology in 1912, and in 1915, Wild Animals: Their Conservation and Value to Man. At about the same time, an evening lecture course known as Functions and Activities of Animals was given co-operatively by the staff, but this course was short-lived.

The elementary course underwent certain radical changes, beginning in 1916. Before that time it consisted of two courses, one in botany, one in zoology, each one extending through the year and having no relation to the other except that students elected both courses at the same time. These courses were now separated, each was given in one semester, and students elected them successively, either one first. That arrangement still prevails. In the spring semester of 1917, beginning students were offered an alternative course, devoted not to dissection of animal types but to biological principles, and one section pursued this course. The next fall the entire beginning class was given the new-style course, which has been widely copied, in whole or in part, in other institutions. Essentially the same course prevails today. In 1929-30 beginning students were again

offered a biology course given by the Departments of Botany and Zoology co-operatively, but this was discontinued two years later.

The general policy determining the selection of courses to be offered has been to provide training in all the fundamental branches of zoology, and from these as a base to extend as far as possible, or as far as the demand warrant's into the specialized fields represented by the interests of the staff.

RESEARCH IN ZOOLOGY.—Sager, the first Professor of Zoology actually to serve in that capacity, published little or nothing in zoology; no articles by him have been found. Winchell was primarily a geologist, and only his paleontological contributions in that field, of which there were several, belong in this account. Those which may be said to represent investigation concerned the succession of organic types (1858), fossil elephants (1863, 1864), and a family of fossil hydroids (1866). Along strictly zoological lines, he described a new species of gar pike in 1864, and perhaps his article on the currant worm (1864) represents original work. Besides these he wrote many popular articles on natural science, education, and religion.

Steere traveled round the world, and a number of his articles relate to the animals observed and collected, particularly in the Philippines. These publications based on his travels appeared chiefly in the years 1874-94; there was one belated article in 1903. His other papers dealt chiefly with the birds and mammals of Michigan.

Reighard had shown an early interest in meteorology, but by the time he came to the University he had transferred his interests to anatomy and histology, in which fields he had published studies as early as 1884. His early work at the University was on the embryology of fishes (1888-93). By 1893, however, his inter-

ests were turning to plankton studies, and his papers up to 1899 were mostly in that field. In 1900 he returned to fishes, primarily the embryology, but also the breeding habits, of the fresh-water dogfish *Amia*. This study of breeding habits initiated a long period of investigation of behavior of animals in nature, which was reflected in the work of his students of that period, and which included a notable study of the supposed warning color of coral-reef fishes (1908). Fishes still constituted Reighard's chief research interest until toward the time of his retirement, when an unfortunate deafness led him to investigate methods of speech reading; and since 1924 he has published many articles on speech reading. Among his publications was the celebrated study *Anatomy of the Cat*, issued jointly with Herbert S. Jennings in 1901, which was based partly on first-hand research.

The trend of research in the Department of Zoology, aside from the research carried on by Reighard himself, has been determined by the interests of many people, some connected with the department only a few years. Jennings, a specialist in rotifers before he came to the University, turned to protozoa while he was here, and through them to animal behavior. Lillie was interested in regeneration and embryology. Johnston was already a neurologist. Most of Holmes's published work dealt with animal behavior. Pearl started in animal behavior, but showed a strong leaning toward biometric studies of variation before he left. Behavior of turtles and fishes, leading to developmental studies of heredity in fishes, occupied Newman during his short stay. Ruthven has been interested in ecology and geographic distribution, particularly of reptiles (see Part VIII: MUSEUM OF ZOOLOGY). Embryology was the subject of Glaser's early researches; he later turned gradually to physiology. Hegner's many pub-

lished researches show a long-continued interest in the germ-cell cycle, particularly in insects. At the time of his stay here, Pearse was concerned with diverse phases of natural history. Shull has worked chiefly on the parthenogenetic-bisexual reproductive cycle in several groups of animals (rotifers, thrips, white flies, aphids), and on the genetic, developmental, and physiological problems connected with these cycles, with a turn in late years to the genetics of *Drosophila*. La Rue's field has been parasitology, his publications largely having dealt with trematode cycles and morphology; Woodhead's interests are similar. Germ-cell cycles and various morphological and developmental problems related to them have occupied Okkelberg and his students. Since coming to the University, Welch has worked on aquatic life—biology of oligochaete worms, physiology of aquatic insects, and limnological studies of Michigan lakes. Aquatic life is also Eggleston's field of research. Heilbrunn was a general physiologist, working mainly on marine eggs. Blanchard published a number of works on the natural history of reptiles and amphibia. Woodward has published studies of the physiology of fertilization, and is directing her students in research in the physiology of reproduction in vertebrates. Hann started with the germ-cell cycle of fishes, but has turned to ornithology.

An indication of the growth of research in zoology at the University is the number of doctor of philosophy degrees in that field. The first was granted in 1899 to John B. Johnston, the second in 1902 to Raymond Pearl. Up to and including the year 1924 a total of fourteen doctorates had been given. In 1925 there was a notable increase, and since that time there has been an average of more than seven each year, the highest number in any one year being seventeen. The total, through June, 1940, is 143.

The publications of the department, most of them based on research, number at least 617; it has been impossible to locate all of them. This number includes only books and articles published while the authors were at the University of Michigan or based on work they have done at the University either as students or as members of the faculty.

The standing of the University as a research center in the field of zoology is indicated by a study made in 1933-34 by the American Council on Education, in which the universities of America were rated by a vote of eminent scholars in the several fields. This study indicated that the University of Michigan is one of eleven institutions which are distinguished as places for graduate study leading to the doctorate in zoology, and that the Department of Zoology is one of fourteen departments in the University holding such distinction.

PLANT AND EQUIPMENT.—When the first classes in zoology assembled, presumably in 1845, the instruction was given entirely by means of lectures, sometimes with meager demonstrations. There was no laboratory, no equipment, and there were only such collections as the professor privately owned. Abram Sager made the first collections, and the Regents paid a taxidermist to care for some of them. Around the "cabinet of specimens" the entire work of the department was organized. The *Catalogue* described the collections of the Department of Natural History in 1850-51 (p. 24) as embracing "a valuable cabinet of Minerals, consisting of between four and five thousand specimens and suits of specimens illustrative of the Geology, Zoology and Botany of Michigan." In 1853 the Regents appropriated "the sum of \$138.00 for the Zoological Department," and this money was used to add to the collections.

It seems evident that the first micro-

scope used in the Department of Literature, Science, and the Arts was that provided by action of the Regents in March, 1856: "Resolved, That Professors Sager and Winchell be a committee to contract for the construction of such a microscope with accessories as they may deem the interests of the University demand" (R.P., 1837-64, p. 640). This instrument cost \$450; later, a two-inch objective costing \$19 was added to it.

In 1858 a most important addition to the teaching material was made by the acquisition of the Trowbridge collection. The *Catalogue* of that year says:

... The *Trowbridge Collection* . . . is an extensive series of specimens in all the classes of the Animal Kingdom, made by Lieut. TROWBRIDGE (late Professor in the University) upon the Pacific coast of our country; it furnishes a complete illustration of the *Fauna* of that coast, and will raise the University collection to a rank among the very first in the country. (*Cat.*, 1858-59, p. 56.)

As was stated in connection with the curriculum, there was at that time also a "complete suite of Birds which visit Michigan," and a collection of two thousand species of snails; and the one microscope owned constituted "means unsurpassed for microscopical observations."

An oven "to protect the Zoological Specimens" was provided in 1861 at a cost of \$15, and by 1867 the department had "a very large Zoological Collection . . . The whole number of entries in the Zoological Cabinet [was] over 6,300, and the whole number of specimens not less than 16,000." Important additions to the collections were made by Steere on his five-year tour of the world in the early seventies and were mentioned in the *Calendar* of 1875-76: "The Steere Zoological Collection, comprising about 25,000 insects, 1,500 shells, 8,000 birds, and numerous representatives of other groups; total, about 10,000 entries and 60,000 specimens." Steere also brought num-

erous botanical and mineral specimens.

Just when additional microscopes were purchased is uncertain, but in 1875 it was said: "The Microscopical Laboratory is now so well supplied with instruments that it can respond to any moderate demand" (*Cal.*, 1875-76, p. 73). There were instruments for making slides, for drawing and measuring with the microscope, for "microchemical work and other methods of observation," and for physiological studies. Furniture, skeletons, and dissection materials were being acquired annually, and from this time on there was a continuous but uneven growth of the equipment for zoological work. But the acquisitions were crude, judged according to present standards. The microscopes purchased even as late as 1885 were, as described by Professor Reighard, "simple in type with no fine adjustment, no condenser, no nose-piece; provided only with the two objectives and two oculars."

The building which first housed the Department of Zoology was, so far as the oldest records show, Mason Hall, which for some years after 1848 was called North College (see Part VIII: FIRST BUILDINGS). Winchell's lecture room, according to Edward Laurens Mark ('71, LL.D. '96), was on the first floor between the two corridors, and other near-by rooms were used for storage. During the greater part of Steere's incumbency the room above this lecture room and the first floor at the north end were museum space, and the southeast corner of the first floor was also occupied by the Department of Zoology. A little later the three main rooms of the department were: (1) a combined lecture room and laboratory, about forty feet square, used largely for identification of species, (2) a smaller room of similar function, about twenty by twenty-five feet, and (3) a third-floor room of about twenty by forty feet. Kitchen tables of oak and

chairs to match were the principal furniture, of which a few articles are still in occasional use.

Some easement of the space limitations was provided by the erection in 1879-80 of the Museum Building (now Romance Language Building). This structure was described in the *University Calendar* of that year as of Neo-Gothic style, one hundred and twenty feet long and forty-seven feet wide, and four stories high. The natural history collections were moved into it in the fall of 1880. In 1885 another large room on the third floor of Mason Hall was turned over to the Department of Zoology; it was first occupied by Howard Ayres, then by Professor Reighard.

An epoch in the expansion of the department was marked by its removal from Mason Hall to the third floor of the South Wing in the summer of 1892. Shortly thereafter the second floor was also acquired, and these two floors constituted the zoological laboratory until 1915. New furniture—including standard tables for two or four students—was built for the new quarters; a departmental library was established; the collection of lantern slides grew rapidly; and various other rooms for storage, private laboratories, and live animals were provided through remodeling. At the time of this removal the department owned only one set of microscope slides, a set illustrating cell division; it was the policy to have students make their own slides in courses. The supplies of the department were accessible to the staff, and each man helped himself, leaving no record of his withdrawals. Equipment suitable for the expanding subject was steadily added—microtomes, paraffin baths, photographic apparatus, aquaria, more microscopes—though never as rapidly as the staff of the department wished. A significant feature of this increase in equipment was that a large

part of it was intended primarily for research. It was a steady growth, unmarked by any startling new development or change of policy.

The next important year for the department was 1913. The legislature of the state voted that year an appropriation of \$375,000 for the construction of the present Natural Science Building. Scarcely had the first steps been taken to plan the building when, on May 28, the old laboratories in the South Wing were destroyed by fire. Courses were left unfinished, but credit was given, and students who had taken this work in the previous year wondered why they never had any luck. Fortunately, the building and its contents were covered by insurance. The reconstruction and replacement were promptly begun, and by the autumn of 1913 the rebuilt laboratories, with a number of new microscopes and some other new apparatus, were ready for students. Some things destroyed, however, were unfortunately irreplaceable. One tragic result was the loss of all data and specimens pertaining to the investigations of a graduate student, who had to start all over again.

In 1915 the department moved into its new fireproof quarters in the Natural Science Building. This structure was still not quite finished, and for a time lecturers competed with hammers and saws and the shouts of workmen. The Department of Zoology occupied the northwest part—in all, about one-fourth of the building, substantially the same part of each of the four floors. Much new equipment was obtained for the new laboratories. In a brochure prepared for an exhibit arranged by all the departments in the Natural Science Building in 1917 was the following description of the section reserved for zoology:

There are seventy rooms in all, including class rooms, student laboratories, private laboratories for instructors and assistants,

a cave in the subbasement, and rooms for aquaria, for making preparations, for chemicals, for photographic work, for constant temperature experiments, for light-reaction studies, for charts, for storage, and a shop for making scientific apparatus.

Changes in the zoology curriculum, exceptional expansion of certain types of work, and the general growth of the University have necessitated modification of these quarters. Some walls have been removed, others have been built in, and the functions of rooms have been changed. Among other things not in the original building but described in the *Announcement* of the College of Literature, Science, and the Arts for 1939-40 are laboratories for parasitology, a laboratory for genetics, and laboratories for groups of graduate students. A dispensary replaced a seminar room; the shop

was moved to larger quarters previously used as a preparation room; a class laboratory replaced the departmental museum; and many other exchanges were made.

Commodious as the department's quarters were in the early years of the Natural Science Building, they are now badly crowded. The laboratories used for the elementary course are occupied from early morning to late afternoon on every teaching day, and no more can be done without seriously impairing the quality of the work. Additions to the building are probably not feasible. At the beginning of the University's second century in Ann Arbor a physical transfer of the department comparable to that of 1892 or of 1915 is, as pharmacopoeia books are wont to say, "indicated."

A. FRANKLIN SHULL

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The Summer Session

THE SUMMER SESSION

AT a meeting of the Board of Regents in March, 1890, Dr. Albert B. Prescott, Dean of the School of Pharmacy, presented a plan for a summer school of chemistry of six weeks' duration, July 7 to August 16. He suggested that the fee be \$25 and that the director of the chemical laboratory be placed in general charge. The instructor, to be appointed by the Board, was to receive compensation proportionate to the funds realized from fees, but neither more than 80 per cent of the amount collected nor more than \$300. The University was asked to advertise by card in a few periodicals of the public schools and to print an announcement in the form of a leaflet. William F. Edwards was appointed Instructor for the course, with the understanding that the work of the students was to be restricted to one room of the chemical laboratory.

This was not, in fact, the first evidence of local interest in summer study. Summer work in surgery was given in 1857 and 1858. The University participated indirectly in a venture known as the Northwestern Summer Institute at Petoskey in 1882. The Institute was organized at least partly on the initiative of University of Michigan faculty members who spent their vacations there, and on its first teaching staff, in addition to professors from Hillsdale and the State Normal School, were Professors Gayley, Payne, Steere, and Stowell, Mr. Hennequin, and Mrs. Stowell. The University even loaned its microscopes. According to the *Argonaut*, the Institute was patterned after the older summer schools of the East, such as those held at Martha's Vineyard, where Professors Winchell, Harrington, and Adams had taught.

In December, 1893, through a committee composed of Elmer A. Lyman, John O. Reed, William F. Edwards, Ernst H. Mensel, and Moritz Levi, and endorsed by Burke A. Hinsdale, the faculty of the Department of Literature, Science, and the Arts asked for the establishment of summer courses six weeks in length for teachers and students who could not attend during the regular year. The Regents decided, in accordance with the plan proposed, to provide for advertising and for faculty compensation out of the summer student fees and to require each instructor to bear the cost of janitor service for the rooms he used. They promptly advanced \$300 for the advertising, and in time a bulletin entitled *Summer Courses of Instruction* was printed.

Although the organization proceeded rather slowly and the program for 1894 was therefore not well publicized, eighty-eight students attended that session. The administrative committee for the summer was composed of Burke A. Hinsdale, Albert B. Prescott, George Hempl, John O. Reed, and Elmer A. Lyman. Courses were offered in English literature by Isaac N. Demmon, in the English language by George Hempl, in composition by Fred N. Scott, and in the science and art of teaching by Burke A. Hinsdale. It was announced that Francis W. Kelsey, Henry A. Sanders, and Clarence L. Meader would teach Latin; Fred M. Taylor, political economy; and Frank N. Cole, Alexander Ziwet, and Elmer A. Lyman, mathematics. George W. Patterson and John O. Reed constituted the physics faculty. Frederick C. Newcombe taught botany; Moritz Levi, French; George O. Higley and William F. Edwards, chemistry; Herbert F. de Cou,

Greek; Ernst H. Mensel, German; Sidney D. Townley, astronomy; and Webster Cook, history. Miss Alice L. Hunt taught drawing, and Herbert S. Jennings offered work in morphology. General public lectures by President Angell and Professors Carhart, Thomas, Demmon, Trueblood, Kelsey, and Hinsdale were announced.

In December, 1894, provision was made for a second session. The tuition fees were fixed at \$15 for one course, \$25 for two courses, and \$30 for three, and again \$300 was set aside for advertising. The range of subjects in the Literary Department was extended in the summer of 1895, and summer work was first offered in the Department of Law. There were twenty-three teachers in all, and the number of students attending the session was 191.

President Angell was authorized by the Regents the following year to choose the faculty in the order of seniority for the next summer, and this group of instructors was permitted to elect a chairman, a secretary, and three others to constitute an executive committee. To the chairman and secretary were given the responsibility of advertising and of conducting the correspondence, as well as the right to withdraw courses elected by fewer than three students. This first executive committee consisted of Elmer A. Lyman, chairman, Ernst H. Mensel, secretary, and Joseph H. Drake, George O. Higley, and Earle W. Dow. The faculty members numbered forty-two, and there were 231 students enrolled, of whom twenty-six were in the Department of Law. Several public lectures were given, including one by President Angell on the war between China and Japan; also, Professor Albert Stanley gave recitals on the new Columbian organ. In the same year, 1896, the second program of summer work in the Department of Law was undertaken. It

was administered by a special committee with Bradley M. Thompson as chairman and Elias F. Johnson as secretary. Seventeen law courses were offered, in addition to special training in elocution and oratory by Thomas C. Trueblood. A course of free lectures by the law faculty on such topics as the Magna Carta, the judicial system of the Jews, and the trial of Jesus, and a lecture by Judge Johnson on the right of a teacher to inflict corporal punishment were given.

At the close of the 1896 session the faculty was satisfied that the experimental stage had been passed. President Angell pointed out that the success of the Summer School warranted its permanent establishment, especially because of the service it rendered public education. It improved the teachers' preparation and naturally raised the quality of the instruction they gave; also, through their interest, it bound the schools more closely to the University. But a better form of organization, especially as to the method of appointing and paying the members of the summer faculty, was needed.

No important changes were made, however, until after the summer of 1898. Angell recorded that throughout these first five years the Summer Schools were "conducted by permission of the Board under a voluntary organization of such members of the literary and law faculties as chose to teach" (*P.R.*, 1898-99, p. 7). There were also one or two instructors from the engineering faculty, whose few courses were listed in the bulletin with those of the Literary Department, although as far as the work of the regular academic year was concerned the Department of Engineering had been made a separate unit in 1895.

Before the summer of 1899 the single Summer School of the literary and engineering faculties was put under the direct control of the Regents, who as-

sumed the financial risk, agreeing in advance on definite salaries for summer appointees at fixed rates per course for the various ranks, and appointed John O. Reed chairman of the executive committee of the Summer School of the Department of Literature, Science, and the Arts. Professor Reed had been a member of the committee of 1898 and also had helped to plan the first organized session in 1894. Continuing in charge of the summer work until he was appointed to the deanship of the Literary Department in 1907, he served first as chairman of the executive committee until February, 1905, and then as Dean of the Summer Session through the next three summers. During these nine years the enrollment rose from 263 to 1,070, a strong organization was built up, and the work for advanced students was developed.

The experiment of 1899 was a success. President Angell then ventured to suggest that the fees be reduced—though not, he warned, at the expense of faculty compensation. His view was that many of those most interested in summer instruction were teachers with small incomes, who found the fees prohibitive, and that the resulting increase in attendance would probably more than offset the loss to the University per student. Furthermore, graduates do better work; an increase in their number would probably improve the prestige of the Summer School.

In January, 1900, the Summer School committee laid before the Regents a set of plans designed to put the summer work "on a scale commensurate with the rank and dignity of the University," and the Board approved all provisions of the report, including even a guarantee of \$2,500, or so much of it as might be needed, to defray any expenses not covered by tuition. According to this outline the University formed a sum-

mer committee on graduate work to maintain a constant relationship with the Graduate School Administrative Council. Plans were made to introduce courses "suitable for graduate students" and to fix the amount of credit allowed for summer work toward graduate degrees. At the same time provision was made for the appointment of outstanding men from other institutions, a new salary schedule was devised, and the name "Summer Session" was first used.

The new plan was tried in 1900, and evidently Angell's prediction of a larger and more mature company of students proved correct. Also gratifying was the fact that several full professors remained to teach.

The Department of Medicine and Surgery began its regular summer work in 1902, and in the following summer the Department of Engineering for the first time gave its courses separately, offering work in civil, mechanical, chemical, and electrical engineering. Though the Biological Station was not authorized until 1909, the possibility of establishing such a camp was first discussed by the Regents in April, 1900, and was again drawn to the Board's attention by Professor Reed in October, 1903, in the regular report of the Summer Session.

The support of President Angell and of the Regents enabled Reed to bring under the direction and control of one Summer Session the University's summer courses in all departments. In February, 1904, the Regents provided for the amalgamation of the summer offerings under one chairman and three secretaries—John R. Effinger, who represented the Department of Literature, Science, and the Arts and the Department of Engineering; G. Carl Huber, the Department of Medicine and Surgery; and Edwin C. Goddard, the Department of Law. Before the summer of 1907 James P. Bird was added to this execu-

tive committee as secretary for the Department of Engineering; otherwise, the administrative organization and personnel remained the same until the end of Reed's service to the Summer Session. Throughout this period all of the summer work was carried on in a session of six weeks except that in the Department of Law, which continued to hold eight-week sessions.

A rule was adopted by the Regents at the time of the amalgamation, permitting leaves of absence on the basis of accumulated salaries; by this regulation, an instructor who had taught during four summer sessions without compensation could obtain a leave of absence for a full academic year. The summer reception was first held in 1904, under the management of the wives of faculty members. The first summer courses in pharmacy were given in 1905, and the first in the Homeopathic Medical College in 1907.

John R. Effinger, who had become a member of the summer faculty in 1897 and a member of the committee in 1900, served as secretary of the executive committee of the Summer Session from 1902 until the end of Reed's administration, and in October, 1907, was made Dean of the Summer Session. Edward H. Kraus then succeeded him as secretary of the executive committee and as the special representative of the Department of Literature, Science, and the Arts.

The attendance grew from 1,077 to 1,324 during the five summers of Dean Effinger's administration, 1908-12, and within the same period longer sessions were introduced, summer library courses were begun (1909), experimental summer field work in botany and zoology was undertaken, and the engineering field work was strengthened.

Though field work in surveying offered by Howard B. Merrick and his assistants

had been listed in the *Announcement of the Summer Session* for three years, the first Summer Session announcement of a surveying camp was made in 1908, when the work was carried on at Burdickville, Leelanau County. At Douglas Lake the Bogardus Engineering Camp was firmly established in 1909 and the Biological Station was set up in a preliminary way. The next year the Biological Station offered regular work.

Dean Effinger had urged in February, 1908, that the summer session be extended to eight weeks, and in the Literary Department and the Department of Engineering the longer term went into effect the following summer. The Department of Law changed from one session of eight weeks to two sessions of five weeks each, beginning in the summer of 1910. This was done to provide for all courses of the first two years, one-half of each in alternate summers.

Edward H. Kraus became Acting Dean of the Summer Session in 1911, permanent administrator in 1913, and Dean in 1916. Kraus's active leadership covered the twenty-one years 1913-33 inclusive. Thoms E. Rankin became the first secretary of the Summer Session in 1916 and was succeeded by Carlton F. Wells in 1929. Louis M. Eich, the present secretary, began his work in 1933.

Among the important advancements in the Summer Session program during Dean Kraus's long administration were the establishment of summer courses in architecture in 1913, the first summer work of the School of Business Administration in the summer of 1917, and a southern Kentucky field station in geology and geography in 1920. The camp was directed first by C. O. Sauer and later (1924-35) by George M. Ehlers.

In 1916, the University Engineering Camp came to be called Camp Davis, in honor of Joseph B. Davis, formerly

Professor of Geodesy and Surveying and Associate Dean of the Department of Engineering. In 1923 the administration of Camp Davis was put under the direction of the Office of the Summer Session, and the camp budget, previously a part of the budget of the College of Engineering, was included in that of the Summer Session. The Bogardus area, in which this camp had been conducted, grew from 1,600 acres to approximately 4,000 acres. The camp was moved to Wyoming in 1929.

Summer plays were developed in 1930 by the Department of Speech and proved to be the introduction of the later summer dramatic programs of the play production classes. The social and physical education programs of the University were also greatly improved by the construction of the Michigan League and the Intramural Sports Building in 1929. An annual gathering of notable research physicists known as the physics symposium and later as the symposium on theoretical physics was begun in 1923.

It is as true as it was in Angell's day that teachers and school officials look to the Summer Session for special training and inspiration. Besides professional courses in education and advanced academic work for teachers—the solid curriculum which has grown slowly, but very steadily, for a period of nearly half a century—a special summer program has in late years been sponsored by the School of Education. Begun in 1929 and dealing with such topics as guidance, remedial reading, and curriculum problems, this program consists of "clinics," special conferences, and short, intensive non-credit courses or institutes.

Other steps in the expansion of the summer program were the inclusion of the School of Music in 1930 and the adoption of the *Michigan Daily* as an official publication of the administration in 1932. It was in this year, too,

that a group of teachers of international law held their first conference in Ann Arbor under the auspices of the Carnegie Endowment for International Peace.

Throughout this period the Biological Station was developed under the active interest of Dean Kraus, who in 1933 joined with Director La Rue and G. Carl Huber, then Dean of the Graduate School, in the celebration of the twenty-fifth anniversary of the Station's activities.

At the beginning of the period in 1913 there were about 175 members of the summer faculty; in 1933 there were 435. The largest number while E. H. Kraus was Dean of the Summer Session was 518 in 1931. Within this same period the student body grew from 1,402 in 1913 to 4,328 in 1931; the total registration in 1933 was 2,962. The largest attendance of undergraduates in the years 1913-33 was that of the summer of 1927, when 1,190 were enrolled.

At first the graduate students formed only a small percentage, but by 1918 the proportion had grown to 11 per cent. At the same time the number of students with college degrees, including not only graduate students but also students enrolled in the professional schools and others not seeking advanced degrees and therefore enrolled in the College of Literature, Science, and the Arts, constituted 21 per cent of the total summer registration. Of the total enrollment in 1926, 26 per cent were graduate students; in 1928, 33 per cent; in 1930, 42 per cent; and in 1933, 44 per cent. In 1930, 60 per cent of all the students had college degrees, and in 1933, 64 per cent. The importance of summer graduate studies was consistently emphasized during Dean Kraus's administration: he served as the first secretary for the executive committee of the Graduate School in the summer of 1928.

Dean Kraus worked unremittingly to

make the Summer Session an integral part of the University—a principle applied more extensively at Michigan than at most other institutions. He also insisted that teachers of advanced rank be retained on the Summer Session faculty in order to provide courses of the same standard as those given during the regular year. The practice of securing an early adoption of the Summer Session budget permitted the working out of the programs carefully and unhurriedly, with an early announcement of the program for each year. Kraus also advocated a salary scale proportionate to the winter pay schedule. Finally, in December, 1927, this scale, the highest in the history of the Summer Session, was adopted by the Regents.

In 1917 the deans and directors of the summer schools of the principal universities of the country came to Michigan and formed an association. This organization has assisted materially in the development of an appreciation for summer study, in large increases in enrollment, and in the placing of summer session programs upon a footing equivalent to that of the regular sessions. In all this work Dean Kraus took an active part, and college and university executives have expressed appreciation of his constructive, persistent, and patient labors.

The first summer session administered by Louis A. Hopkins, the present Director, was that of 1934. During the seven-year period extending through the summer of 1940 the enrollment of undergraduates in the College of Literature, Science, and the Arts increased from 577 to 717, while the College of Engineering had a much larger relative growth, from 250 to 400. In the Medical School, the Law School, the College of Pharmacy, the College of Architecture and Design, and the School of Business Administration the summer attendance has remained constant for many years. The en-

rollment in the School of Forestry and Conservation, on the other hand, grew from thirty-two in 1934 to sixty-two in 1940. But the two units of the University that have had the greatest rise in summer enrollment are the School of Music, in which attendance increased from 101 to 321, and the Graduate School, in which the attendance was more than doubled in this seven-year period. There were 1,645 graduate students enrolled in 1934 and 3,438 in 1940. The total attendance of these seven years was as follows:

1934.....	3,272
1935.....	4,066
1936.....	4,528
1937.....	5,110
1938.....	5,771
1939.....	5,594
1940.....	5,680

Until 1939 there was a continually mounting enrollment in successive summer sessions which more than kept pace with the rate of growth of the enrollment during the regular academic year. Even in the summer of 1939, when there was a decrease that preceded by fifteen months a similar downward turn in the attendance at regular academic sessions, the summer enrollment was more than one-half that of the previous second semester and nearly one-half that of the following first semester.

The well-established activities previously carried on by the Summer Session have been continued—the conferences on international law, the symposia on theoretical physics, the programs of special interest to educators, the work of the Biological Station and of the other summer camps, and the excursions conducted for a number of years to points of scientific, industrial, or scenic and general interest. Among these are Niagara Falls, the island of Put-In Bay in Lake Erie, Greenfield Village and the Ford automobile plant in Dearborn, and

the Cranbrook School near Bloomfield Hills.

Since 1935 the W. K. Kellogg Foundation has co-operated with the School of Education in giving varied programs of in-service education for teachers. These have included scholarships for study at the University as well as grants for the support of workshops provided in selected communities in the Michigan Community Health Project. This is the name given to the program in seven counties in western Michigan in which the Kellogg Foundation has been supporting numerous undertakings for community betterment. In the summer of 1938 a special curriculum laboratory was established in Ann Arbor in co-operation with Wayne University, Michigan State College, and the four state teachers colleges. In the same year, on the invitation of President Webster H. Pearce, the University established a graduate center at Marquette in the buildings of the Northern State Teachers College.

The Departments of Geology and Geography operated their last joint summer camp in southern Kentucky in 1934. In 1935 the Department of Geography carried on its field work in the Upper Peninsula near Menominee, and since then, with the generous co-operation of the State Department of Conservation, has maintained a field station at Wilderness Park, fifteen miles west of Mackinaw City. The Department of Geology for three summers, 1935-37, used State Bridge, Colorado, as its base. Since the summer of 1937 the field work in geology has been given with that in surveying at Camp Davis near Jackson, Wyoming. Camp Filibert Roth at the site near Munising had outgrown its capacity by the end of 1935. Obtaining generous terms from the Von Platen-Fox Lumber Company, the University adapted for instructional purposes a lumber camp on Golden Lake, Iron County,

Michigan, to the west of Iron River, and opened it as Camp Filibert Roth in 1936. Recently the same company deeded a small tract of land on the lake front to the University, thus making possible a permanent establishment in the Ottawa National Forest. Since 1936 the applications for admission to the Biological Station have exceeded the available accommodations.

With the assistance of the Chrysler Corporation the College of Engineering has in recent years usually brought in outstanding men from other universities to conduct extra graduate work and the symposia in theoretical mechanics. In 1937, with the co-operation of five large electrical industries, the College developed a special program in electronics. Special emphasis in 1940 was placed on internal-combustion engines, advanced thermodynamics, and mechanical engineering.

The music clinic for high-school students, a successful annual event organized by the School of Music, was first held in 1936; in the same year the French House was established, and this also was successful and has been continued in later years. Professor Elmer D. Mitchell led a group of students in physical education on a study tour in Europe that summer, visiting eight European countries and concluding the journey at the Olympic games in Berlin. It was in the summer of 1938 that the Detroit program of the University in social administration came under the direction of the Summer Session.

In the period during which the present Director has served, the general program has been changed. Formerly the several departments arranged their programs somewhat independently, but at present emphasis is placed on groups of co-operative studies with each group under the direction of a joint committee selected especially for the purpose. A most

interesting development of recent years, which serves well to illustrate the use made of co-operative committees, is that of the Summer Session institutes and programs of emphasis.

The annual Linguistic Institute, sponsored by the University, the Linguistic Society of America, and the American Council of Learned Societies, was organized in 1936 and has served as an occasion for bringing to the campus outstanding authorities in linguistics from other universities. The Institute of Far Eastern Studies, organized in 1938 and conducted again in 1939, has capitalized a long-standing tradition of the University's interest in the Orient. In the summer of 1935 Professor Robert B. Hall and a group of advanced students of geography went to Japan and carried on intensive studies of the densely populated area of the Yamato basin. With the assistance of the Institute of Pacific Relations and of the American Council of Learned Societies, schools of emphasis were carried on during the summers of 1937 and 1938 in the Chinese, Japanese, and Russian languages. The graduate conference on Renaissance studies was organized in 1938, and a second such conference was held in 1939. The Institute of Latin-American Studies, sponsored jointly by the University and the committee on Latin-American studies of the American Council of Learned

Societies, with the co-operation of that council and of the Rockefeller Foundation, was begun in 1939. In the summer of 1938 the auditorium of the new Rackham Building became available for special lectures, which have been arranged in several series corresponding to the various institute programs. In 1940 a graduate study program in American culture and institutions was organized under the auspices of the Summer Session. It included courses selected from the programs of the Departments of Economics, English, Geography, History, Philosophy, Political Science, and Sociology. In addition, a number of public lectures were given throughout the period by qualified members of the University staff and by special lecturers brought from other institutions. Round-table discussions of the general topics, each of which formed the subject of a week's work, were part of the general program.

Through this development of summer institutes the enthusiasm and devotion of the younger members of the faculty have been encouraged, and by means of the constructive attitudes of the departmental organizations there has been developed to a higher degree a stimulating and interesting atmosphere which has enabled the University to use more effectively the riches of its intellectual life.

LOUIS A. HOPKINS

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THE BIOLOGICAL STATION

IN the spring of the year 1900 Professor Jacob E. Reighard of the Department of Zoology appeared before the Board of Regents to discuss the establishment of a biological station on the Great Lakes, to be under University control but maintained by the government. The Regents then asked President Angell to take the matter up with Senator James McMillan in the hope of obtaining favorable action by the government. Apparently the project came to naught. The idea was not entirely abandoned by the University, however, for in October, 1903, Professor John O. Reed included in his plan for the betterment of the Summer Session a suggestion that a biological station be established at some suitable place on the lakes of Michigan, "for the study of Botany and Zoology and for accommodation of persons desiring to do advanced work in those lines" (*R.P.*, 1901-6, p. 270). But again no immediate action resulted.

Authorization of the establishment of a biological station was finally secured and was recorded thus in the minutes of the Board of Regents for April 28, 1909:

On motion of Regent Carey it was voted that a teaching or research station in Botany and Zoology at a total appropriation for equipment, salaries and other expense for 1909 not to exceed \$2,000, should be established at the Bogardus Engineering Camp,¹ provided at least twenty students should elect the course for the coming Summer Session. (*R.P.*, 1906-10, p. 472.)

During the summer of 1908 the University had acquired a tract of land of nearly fourteen hundred acres, on the south and east shores of Douglas Lake, Cheboygan County, partly by purchase and partly by gift from Charles and Hannah W. Bogardus, of Pellston (*R.P.*, 1906-10, pp. 274-75, 348). According to Reighard, Colonel Bogardus and his wife had expressed the wish that scientific work be done on the site:

With that remark, the biological station was conceived. Dean Cooley wanted still more land and thought that the founding of a biological station might lead Colonel and Mrs. Bogardus to offer it on the same favorable terms as before. He took the matter to the

¹ This name later (Mar., 1916) was changed to Camp Davis.

Board of Regents and, largely through the efforts of Regent Carey, they were persuaded to send a committee from Ann Arbor in the fall of 1908 to look over the proposed site. (Reighard, p. 5.)

The personnel of that committee does not appear on the records of the Regents, nor is their report acknowledged or published. Reighard stated that he was not a member and that he did not know its membership, but that Frederick C. Newcombe of the Department of Botany represented the science of biology, and he believed that the secretary of the University and several Regents were members of the party. The committee recommended that the Regents found a biological station to be administered by the Summer Session. George P. Burns, of the Department of Botany, who may have been a member of the committee, strongly urged the establishment of a biological station.

Although only fourteen of the required twenty students applied for admission, the Biological Station was permitted to go ahead under the directorship of Reighard and with Burns as the other member of the teaching staff and Miss Frances J. Dunbar as general assistant.

For buildings the Station had one of the two small, old log buildings which had been hastily built about 1904 for use as a railroad grading camp. The surveying camp was located a third of a mile farther west on South Fishtail Bay of Douglas Lake. About six miles to the west and a little south was the village of Pellston, eight miles southeast was Topinabee, and thirteen miles northeast was Cheboygan.

A plague of black flies delayed the opening of the session for a week, and this delay gave much-needed time for erecting the tents for living quarters and for installing shelves and windows in the log laboratory and a platform and a hand pump for the aquarium.

Photographs taken at the time record these preparations and the barren appearance of the landscape, which had been repeatedly burned over. Gaunt black stubs twenty to fifty feet high were prominent features of the landscape, and huge pine stumps showed that a magnificent pine forest had been removed some thirty years earlier (1876 and 1877).

The women students lived in tents pitched near the engineers' dining tent on the hill behind the surveying camp. The men's tents were pitched along the shore west of the log laboratory. The log laboratory had shelves for equipment, books, supplies, and specimens, also tables for classes, research, and office work.

Those few tents, some of them borrowed, and the old log building used as a laboratory, with a small shed attached at the rear, a platform, a water tank, and a hand pump for the aquarium, constituted the physical plant. The fleet consisted of three rowboats. There were no automobiles nor trucks for transportation overland. Students and staff boarded at the dining tent operated by the Bogardus Engineering Camp.

Since the Biological Station was still considered an experiment, at the close of the session the students were asked to report on the value of their work and their experiences during the summer. Without exception, these reports (in the Biological Station files) were enthusiastic in their praise of the character and quality of the instruction, of the type of courses offered, and of the value of the work accomplished in preparation for teaching and research. All placed high value on their experiences. Most of the students preferred living in tents to living in dormitories. Their suggestions in these letters had considerable weight with Director Reighard and with the administration in evaluating the

Station as an experiment in biological education.

Although the Station was considered to have been successful, there remained much uncertainty regarding its permanence and, particularly, its location. From 1913 to 1916 inclusive the very existence of the Station was endangered; it lacked the strong support of the Departments of Botany and Zoology. A majority of its staff and students came from other institutions. The comprehensive and vigorous report of Director Otto C. Glaser at the close of the session of 1916 brought it the needed support of the departments and strengthened the determination of the Summer Session authorities to continue its existence. Since that time the Station has been looked upon as an established part of the Summer Session and well past the experimental stage.

The Station had been situated on Douglas Lake because the University owned the land and on that particular site because of its proximity to the Bogardus Engineering Camp and the availability of the log buildings. There had been no survey of the state to determine the best area for a biological field station, nor had the Bogardus tract been carefully surveyed for the best site. As early as 1911 parties from the Station had examined Burt Lake and had reported on its unsuitability as a location. Adverse reports were made following examinations of Pine Lake in Charlevoix County in 1917 by members of the staff and of a tract south of Williamsburg in 1927 by members of the staff and Regents Beal and Hubbard. In later years much of the shore line of Douglas Lake was carefully examined, and reports were made on part of Section 29, Munro Township, lying at the northwest corner of the tract. Again and again the directors and their staffs examined Grapevine Point, about three-fourths of a mile north of

the Engineering Camp, and brought that site to the attention of the Board of Regents. Plans were prepared for the development of a physical plant on that site, and repeated requests for funds for that purpose were presented to the Board. In turn, the Board, no less than twice, requested funds from the legislature for the development on Grapevine Point.

Meanwhile, after the World War, the growth in the enrollment at the Biological Station had been rapid and continuous. Many small buildings had been erected on the narrowly limited original site, bounded on the front by the lake and on the side and back by the engineers' base line and an old dry beach pool. Roads and streets had not been built and could not be cheaply constructed on the soft beach sand. A water supply under pressure, sanitary toilets, and other conveniences had not been provided. The old site was recognized as intolerable, and the need for expansion became greater year by year.

In the fall of 1927 a party consisting of President Little, Secretary Smith, Regent Beal, Deans Huber, Kraus, and Dana, Professors Bartlett and Ruthven, and Directors La Rue and Johnston inspected the two camps on the Bogardus Tract and examined Grapevine Point as a site for the Biological Station. By that time the staff members had become convinced that no better area for biological study would be found in the state, and the great value of the accumulated data was recognized.

Following that trip of inspection it was made known that Director Johnston and the staff of Camp Davis desired to give up their location on Douglas Lake and to build a new camp in Wyoming. Growth of trees and underbrush, since fires had been prevented, had been so great as to interfere seriously with the practice of surveying. The old

engineering camp thus became available for the Biological Station, and the plan to erect buildings on Grapevine Point was abandoned.

The summer of 1928 was spent in preparing plans for the occupation of the Camp Davis site. In February, 1929, the Regents set aside the sum of \$70,000 for the development of camps for surveying and biology. That summer and fall and the spring of 1930 were spent in carrying out these plans. On the old Camp Davis site this work involved the cutting and grading of new streets, the extension of the water and sewage systems, and the erection of several buildings. New water tanks and septic tanks were built, and two two-story laboratory buildings were constructed, in addition to an administration building to house offices, with a stockroom-store on the first floor and a dining hall and a kitchen on the second. Ninety-nine other buildings were moved or put onto foundations. Although work had not been completed, the session of 1930 was held in the new location, which included the old Camp Davis site and extended as far to the east as the old log laboratory.

On this site there is a central campus area which includes the laboratories, the keeper's residence, the aquarium building, a small animal house, a garage, the library, the clubhouse, and the administration building. Immediately to the west on the main street (State Street) is a group of eighteen small houses set aside for married students, and on the hillside behind and west of this area is a group of twenty-three small houses for men students. At the west end of State Street are a garage and the covered harbor and boathouse. Immediately east of the campus area along State Street are the three Health Service buildings, an office and living quarters for the dean of women, living quarters for the kitchen force, and thirty-one houses for women

students, guests, and investigators. Along East State Street, extending from the guest houses to the log laboratory, are a dozen houses for faculty members.

Since 1930 many unfinished construction jobs projected on the original plans have been completed. These include additions to the aquarium building, the conversion of the basement of the Camp Davis kitchen into a photographic suite with five darkrooms, the insulation of the dining hall and kitchen, the wiring of many buildings for electric light or power, the construction of retaining walls and of stone paths from broken concrete floors, the development of clayed paths, the construction of terraces in front of the administration building, of log stairways outside certain buildings, and of a tower on which insects can be collected at night with the aid of an arc light, and the reconstruction of the baseball diamond.

Except for the construction of fire lanes around the two stations and attempts to prevent forest fires, no efforts had been made for more than twenty years to improve the forest on the tract. Natural reseeding was in process on certain areas, but on others there were only scattered clumps of bushes and aspens. In 1930 the forest was placed under the supervision of Professor Willett F. Ramsdell, of the School of Forestry and Conservation, in order that the existing forest might receive expert care and be improved by planting and by the removal of the less desirable trees. This was made possible through the generosity of the George Willis Pack Foundation and of members of the Pack family. Before June, 1937, approximately one thousand acres had been planted. A program of long-term studies on the Biological Station forest has been instituted by Ramsdell and his colleagues.

The fire lanes built around the two stations in the early years had long gone

untended. In 1931 the co-operation of the State Department of Conservation was secured in the construction of certain fire lanes on the property; later, with the aid of the Civilian Conservation Corps, the University was able to have some miles of work roads built and the fire lanes extended and improved. These are maintained by annual cultivation. The CCC in 1933 constructed a building for the forestry equipment and in 1934 erected an eighty-five-foot fire tower which had been donated by the Department of Conservation.

The original tract of nearly fourteen hundred acres has been extended by purchase and by acquisition of tax titles. In 1940 it comprised about four thousand acres. Early in 1942, by means of a special legislative act, the State Department of Conservation was enabled to transfer to the University for the purposes of its Biological Station more than three thousand acres of tax-reverted lands which the Department of Conservation had earlier acquired from the state. Nearly half of this new tract is adjacent to the old one, but other parcels are separated.

INSTRUCTION AT THE BIOLOGICAL STATION.—Teaching is an important function of the Biological Station. With few exceptions the courses offered have supplemented instruction given in colleges and universities, and emphasis has been placed upon field work, but not to the exclusion of work in the laboratory and the library, the degree of emphasis upon each aspect depending upon the course and upon the special interests of the instructors and the students.

In the following brief account of the courses subject matter can be indicated only by titles. It is impossible to describe clearly the changes in content, method, and emphasis as the professors changed.

Zoology.—Courses treating the field aspects of vertebrates have been an important part of the offerings of the Sta-

tion from the beginning. The first course was entitled the Natural History of Vertebrate Animals. With some changes in title and emphasis this course was given by Jacob E. Reighard (1909, 1911–12), Norman H. Stewart (1910), Max M. Ellis (1913–17), and Frank Smith (1919–22) for two hours of credit. Reighard emphasized behavior and evolution in lecture and library work, but field studies received attention. Stewart gave emphasis to field studies, Ellis and Smith to ecology and taxonomy. This course was replaced by Ichthyology, two hours, and Herpetology and Mammalogy, two hours, both offered by Francis Harper in 1923 and 1924 and by Charles W. Creaser since 1925.

Birds were included in Natural History during the years 1909 and 1910, but in 1911 became the object of a separate two-hour course, the Natural History of Birds, given by Smith and continued by Smith and John S. Dexter (1912), Ellis and James S. Compton (1913), Compton alone (1914), Norman A. Wood (1915), and Reuben M. Strong (1916). The title was changed to Ornithology in 1917, and under this name the course was given successively by Strong (1917), Roland F. Hussey (1918), Day-ton Stoner (1919–20), Zeno P. Metcalf (1921), Frank N. Blanchard (1922–27, 1929–37), Alfred O. Gross (1928) while Blanchard was on leave, and Olin S. Pettingill (1938—). Because of increased interest in the subject, Advanced Ornithology was started by Blanchard in 1923. For many years the enrollment in the elementary ornithology course was higher than that in any other course except Entomology.

The invertebrates have always received their share of attention. Reighard gave a course entitled Fresh-Water Biology, two hours credit, in 1909. This course gave way in 1910 to the Natural History of Invertebrates, by Arthur S.

Pearse. Without change of title this course was given successively by Frank Smith (1911-14), Robert W. Hegner (1915), and Otto C. Glaser (1916). Then the title was changed to read, the *Natural History of Invertebrate Animals with Reference to the Principles of Ecology*, and it was given by Walter N. Koelz (1917) and by Paul S. Welch (1918-22), who emphasized the limnological aspects and introduced quantitative methods. In recognition of these changes, the course was renamed *Limnology* in 1923. The *Natural History of Vertebrates* was re-established in 1933 as a four-hour course, and it has been given regularly by Frank E. Eggleton, with emphasis upon taxonomy and ecology of invertebrates exclusive of insects and parasitic worms.

Limnology, as indicated above, developed from the course known as *Natural History of Invertebrates* and was first given under its new name in 1923 as a four-hour course. Since its inception it has been taught continuously by Welch, although Eggleton was associated with him in this work for three years (1931-33). The need for additional training in methods of limnological research led in 1931 to the establishment of a two-hour course named *Limnological Methods* and given by Eggleton. Repeated in 1932, it has been given in alternate years thereafter.

Instruction in entomology began in 1912, when a two-hour course entitled the *Natural History of Insects* was offered by Smith and Welch, with Welch giving the instruction. It was given by Welch in 1913, by Ellis in the years 1914-17, and in 1918 by Welch, as Ellis had been called to war service. Stoner gave the course in 1919 and 1920, and Metcalf in 1921. Without undergoing any change in content, it was renamed *Entomology* in 1922, and Robert Matheson was put in charge. It was made a four-hour course

in 1923, when Herbert B. Hungerford took charge of it. Hungerford has continued to give the course except in 1928, when he was on leave and Clarence H. Kennedy gave it. For years this course had been deservedly popular, and usually there were more students enrolled in it than there were in any of the other courses.

A course in helminthology was established in 1927 and has been given every year since by William W. Cort and Lyell J. Thomas.

In 1910 Arthur S. Pearse and Miss Mary T. Harmon gave the course entitled *Zoology for Teachers*, and Horace B. Baker gave *Natural History of Mollusks* in 1911. Neither course has been repeated.

In the early years students who had had no previous biological training were sometimes admitted to courses in zoology. Only once, in 1915, was the elementary course called *General Zoology* given, and then Cort was in charge. With few exceptions since that date students taking zoology courses have been required to present one or more courses in biology or zoology for entrance.

Botany.—During the first three years there was a complete change of the botanical staff (one professor) each year, resulting in extensive changes in courses.

During the first session, however, three important lines of botanical work were begun which have been pursued almost without interruption to the present. These are ecology, systematic botany, and a botanical survey of the region. From time to time there have been changes in emphasis, new aspects of these major fields have been undertaken, and new courses have been added as the staff grew and demand warranted.

The Teachers' Course in Ecology, which was given by George P. Burns in 1909 for two or for four hours of credit, was never repeated in that form; in 1913

and 1914, however, a course called Ecology but which dealt with the ecology of plants, two hours, was given by Henry A. Gleason. It was enlarged to a four-hour course in 1915, when it was given by Gleason and Frank C. Gates. Since that time it has been given annually by Gates. In 1930 the title was changed to Plant Ecology. A two-hour course known as Advanced Ecology was given by George E. Nichols in the summers 1926-30 inclusive.

The first course in systematic botany (1909) was Burns's Identification of Trees and Shrubs, two hours, which was superseded in 1910 by a more general course, Systematic Botany of Seed Plants, two hours, by Pool. Since that time it has been called Systematic Botany and has been given by Gleason (1911-14), Frank C. Gates (1915), John H. Ehlers (1916-38), and William C. Steere (1939-). Advanced Systematic Botany, two hours, dealing with grasses and sedges, was instituted by Ehlers in 1915 and was given annually thereafter until 1932, since which time it has been alternated with Aquatic Flowering Plants, two hours, also given by Ehlers and continued by Steere (1939-).

The systematics of the lower plants have also been the subject of courses. Taxonomy of the Bryophytes, two hours, and Taxonomy of Fresh-Water Algae, two hours, have been given by Nichols (1920-38), Hempstead Castle substituting for him in 1931 during his illness. The algae course has appeared under a variety of titles. The two-hour course named Mycology and given by R. J. Pool in 1910 has never been repeated, although the present staff has been on record for many years as favoring the re-establishment of such a course.

During the early years some students without previous biological or botanical training were admitted. For them in 1910 Pool gave a four-hour course desig-

nated the Course in Field and Forest Botany. This was continued by Gleason and Fred A. Loew during the summers of 1911 and 1912, and was given by Harry N. Whitford in 1913, by Gleason and Frank T. McFarland in 1914, by McFarland in 1915, and by Richard M. Holman in 1916 and 1917. For students with only laboratory training in botany this course served as an introduction to field work and became the vehicle for ecological training during the summers 1910-12, when a regular course in ecology was not given.

Plant Anatomy was a two-hour course established in 1915 by Gleason and Walter E. Rogers, and was enlarged to a four-hour course in 1930. Those who have given it are Holman (1916-17), Ehlers (1918), Bert E. Quick (1919), Nichols (1920-22), Gleason (1923), William Seifriz (1924), and Carl D. La Rue (1925-). A second course, Ecological Plant Anatomy, two hours, was given by C. D. La Rue in the summers 1926-35 inclusive. The latter course gave way to Plant Tissue Culture and Morphogenesis (1936-), also given by La Rue.

Plant Geography, a two-hour lecture course, was begun by Seifriz (1924) and was given after the first year by C. D. La Rue (1925-29).

Research.—From the very beginning, qualified students have been invited to undertake research on the flora and fauna of the region, under direction. Among the subjects offered in botany may be noted ecology (Burns), taxonomy and ecological relations of bryophytes and algae (Nichols), ecology of flowering plants (Gleason, Gates), taxonomy and distribution of flowering plants (Ehlers), plant anatomy, tissue culture, and morphogenesis (C. D. La Rue).

In zoology research has been offered in these fields: systematic and faunal zoology (Pearse), behavior of animals in relation to their environment (Pearse),

evolution and behavior (Reighard), fishes (Reighard, Ellis, Smith, Francis Harper, and Charles W. Creaser), Sporozoa (Ellis), Oligochaeta (Smith, Welch), mollusks (Baker), insects (Welch, Ellis, Stoner, Metcalf, Matheson, Hungerford), sponges (Smith), arthropods (Hegner), birds (Strong, Stoner, Metcalf, Gross, Blanchard), amphibians and reptiles (Blanchard), parasitic worms (Cort, George R. La Rue, Thomas), aquatic organisms (Smith), mammals (Harper, Creaser), limnology (Welch), and natural history of invertebrates (Eggleton).

Graduate students, staff members, and visiting investigators have published no less than 450 scientific papers based on the fauna and flora of the Douglas Lake region during the years 1909-39, making that region well known to biologists of the world.

PERSONNEL.—The Biological Station has developed under the directorship of six men: Jacob E. Reighard, 1909-14 (not in residence in 1910, 1913, and 1914); Arthur S. Pearse, Acting Director, 1910; Henry A. Gleason, Acting Director, 1913 and 1914, and Director, 1915; Otto C. Glaser, 1916; George R. La Rue, 1917-39; and Alfred H. Stockard, secretary, 1931-39, and Director, 1940—.

It is impossible to list all the faculty members and give a full description of what they have accomplished for the Biological Station. A number of men taught for a single session, others for two or three, a few for many years. In general those who served the Station for long terms have made by far the greatest contributions to the development of research and teaching programs. Professor Reighard was in residence during three sessions only, but he exerted a profound influence on all aspects of the Biological Station program. He emphasized research, insisted that the courses be based on the fauna and flora of the

region and that they be scientific, and set up the daily routine which has since been followed with only minor variations. Gleason (1911-15) developed a course in plant ecology and ecological methods. His branch of teaching and research has been ably carried on since his time by one of his students, Frank C. Gates (1916—). Frank Smith, of the University of Illinois, was a member of the staff from 1911 to 1914 inclusive and again during the summers 1919-22 inclusive. During his first period of service he developed courses dealing with invertebrates, and in the second period he took over vertebrate courses, which he ably conducted.

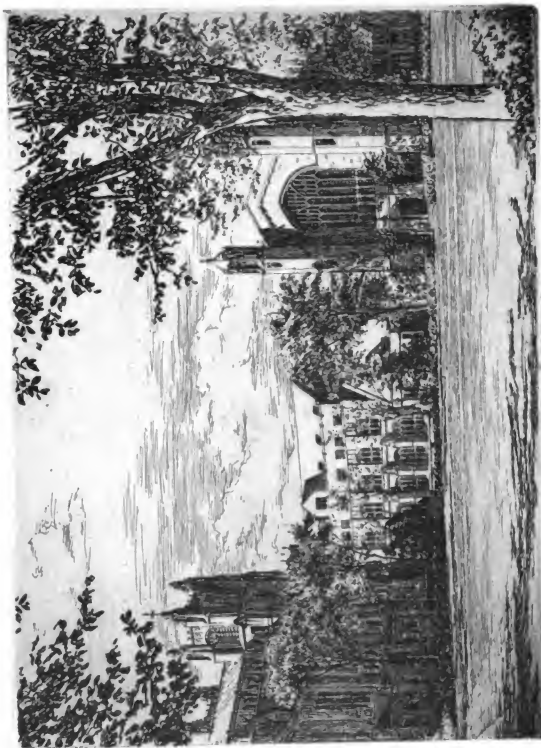
Faculty members who have served the Biological Station for many years and have made important contributions to teaching and research include Frank N. Blanchard, who had charge of the teaching in ornithology and of the research in both ornithology and herpetology in the years 1922-37; William Walter Cort of Johns Hopkins University (1915-16, 1927—), in parasitology; Charles W. Creaser of Detroit City College, now Wayne University, in ichthyology, herpetology, and mammalogy (1925—); Frank E. Eggleton (1929—) in limnological methods and the natural history of invertebrates; John H. Ehlers (1916-38), in systematic botany and aquatic flowering plants; Frank C. Gates of Kansas State College (1915—), in plant ecology; Herbert B. Hungerford of the University of Kansas (1923—; on leave, 1928), in entomology; Carl D. La Rue (1925—), in plant anatomy, plant tissue culture, and morphogenesis; George E. Nichols of Yale University (1920-38), in the taxonomy of algae and bryophytes; Lyell J. Thomas of the University of Illinois (1927—), who was associated with Cort in parasitology; and Paul S. Welch (1918—), in limnology.

GEORGE R. LA RUE

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PART V



The Law Quadrangle, University of London
(27)

THE LAW QUADRANGLE

W. G. 18 1/2 in.

The Medical School

THE ADMINISTRATION AND CURRICULUMS

IN 1817 the governor and judges of the Territory of Michigan passed an act establishing the Catholepistemiad, or University, of Michigania. Of the thirteen *didaxim* or professorships, one *didaxia* was designated as *iatrixia* or the medical sciences. There is nothing to indicate that actual instruction in medicine was given at that time.

Twenty years later, in January, 1837, Michigan was formally admitted to statehood by Congress, and the legislature of the state, on March 18, passed the organic act establishing the University of Michigan. It was specified that the University was to consist of at least three departments: the Department of Literature, Science, and the Arts, the Department of Law, and the Department of Medicine.

The vastness of the educational scheme laid down by the organic act, as well as financial difficulties, made it necessary for the Regents to act slowly. The Department of Literature, Science, and the Arts opened its doors in the fall of 1841, and for some years the tenderest care and every effort were needed to keep that much of the University alive. Six years elapsed before the matter of a medical college again came up for consideration.

At a meeting of the Regents, January 7, 1847, a communication was read "from Drs. Sager, Douglass,¹ and others, Surgeons, Physicians, etc., in reference to a Medical Department in the University," and this was referred to a committee of five, one of whom was Dr. Zina Pitcher, which reported on the following day a recommendation for the creation of such a department with four professors and a six months' course. The report

was accepted, but after some discussion, on motion of Chief Justice Ransom it was recommitted. The next day the committee, for some unaccountable reason, presented a lengthy and adverse legal opinion to the effect that the Board had neither the authority nor the means to erect necessary buildings without specific action of the legislature.

At the same meeting Dr. Pitcher offered a resolution committing the Board to the organization of the Medical Department, but this was tabled. Whereupon he gave notice that he would call the resolution up again at the next annual meeting. This he did, and, in August, 1847, a committee of three was appointed to report at a further meeting "upon the expediency as well as upon the plan of organizing the Departments of Medicine and Law." Dr. Pitcher, as chairman of this committee, presented to the Board on January 19, 1848, a lengthy and masterly report on the need of a medical department, and although two of the three members of the committee were lawyers, the subject of a law department was not stressed. The adoption of this report, the appointment of Dr. Douglass and Dr. Sager as professors in the new department, and the appropriation of \$3,000 for a "laboratory" make January 19, 1848, the natal day of the Medical Department. The first session of the Medical Department was to begin in the fall of 1849, but because of delay in the construction of the laboratory, or medical building, its doors were not opened until the fall of 1850. The original medical building was finally completed at a cost of \$8,981.

The establishment of the Medical Department was essentially due to three

¹ The name was spelled "Douglass" after 1873.

men, Zina Pitcher, Silas H. Douglass, and Abram Sager. Dr. Pitcher was one of the twelve original members of the Board of Regents appointed in 1837 and was reappointed in 1841, 1845, and 1849; he retired on the last day of 1851, at which time the appointive Board gave way to one elected by the people, as provided by the Constitution of 1850. He was the only member to serve continuously from its inception to its reorganization—a period of fifteen years. This may be taken as evidence of his intense devotion to the cause of education. The esteem in which he was held by his colleagues on the Board is to be seen in the fact that in July, 1848, a few months after the organization of the Medical Department, a committee appointed to name the University buildings, proposed to call the North Building "Mason Hall" and the South Building "Pitcher Hall." This report, although accepted, was tabled. The following day a motion to name the North Building "Mason Hall" was also tabled.

THE ORIGINAL FACULTY.—The Organic Act of 1837, in establishing the University, provided by name for six professorships in the Medical Department, as it was officially designated until 1915. These were: (1) anatomy, (2) surgery, (3) physiology and pathology, (4) practice of physic, (5) obstetrics and the diseases of women and children, (6) materia medica and medical jurisprudence. It provided further, that in the first organization of the University the Regents should "appoint such a number only as the wants of the institution shall require; and to increase them from time to time, as the income of the fund shall warrant . . . *Provided always*, that no new professorship shall be established without the consent of the legislature."

The Organic Act of 1837, in designat-

ing the professorships in the Department of Literature, Science, and the Arts, provided for a chair of chemistry and pharmacy. Hence these subjects are listed in the title given in 1839 to Dr. Douglas Houghton. In the Statutes of 1846, replacing this act, the sixth chair mentioned above was designated as that of *materia medica*, pharmacy, and medical jurisprudence. It may be inferred that Dr. Silas H. Douglass and Dr. Samuel Denton, then state senator, may have effected this transfer of pharmacy to the medical faculty.

The new Constitution which went into effect in 1851 omitted the naming of specific professorships and hence the Regents, after that date, became free to create new professorships and to give to each whatever title was desirable.

The Regents, in making the first appointments in the Medical Department, endeavored to comply with the letter of the law as far as the naming of the chairs was concerned. At the same time, considering the qualifications of the men to be appointed, the duties assigned to the holder of a chair might be quite different from those implied by the title. Thus, in the report to the Regents in January, 1850, the faculty was to consist of the following:

A Professor of *Materia Medica* and Pharmacy and Medical Jurisprudence, who would teach only Pharmacy and Toxicology.

A Professor of Anatomy, who should do the duties of the Chair of Surgery.

A Professor of Pathology and Physiology, who should besides Physiology also do the duties in part of the Professor of *Materia Medica*.

A Professor of Practice of Physic (including Pathology).

A Professor of Obstetrics and the Diseases of Women and Children. (*R.P.*, 1837-64, p. 442.)

At no time in the records of the organization of the Medical Department

was chemistry mentioned. Doubtless, it was tacitly understood that this subject was to be taught by Dr. Douglass, who, since 1846, had been Professor of Chemistry, Mineralogy, and Geology in the Department of Literature, Science, and the Arts.

The term chemistry could not be used legally in the title of Dr. Douglass as a professor in the Medical Department and hence, conforming to the law, he was designated as Professor of *Materia Medica*, Pharmacy, and Medical Jurisprudence, who "would teach only Pharmacy and Toxicology." A free interpretation of these two subjects might be taken to imply chemistry. At all events Dr. Douglass did teach chemistry in 1850 and thereafter, but did not teach *materia medica*. There being no longer any legal obstacle, in 1855 the title of Dr. Douglass was amended by substituting toxicology for medical jurisprudence.

An equally striking circumlocution was presented in the case of Dr. Jonathan Adams Allen, who in 1850 was made Professor of Pathology and Physiology, but "who should besides Physiology also do the duties in part of the Professor of *Materia Medica*." At the same time Dr. Samuel Denton was given the legal title of Professor of Practice of Physic, with the words "including Pathology" understood. It was perhaps deemed more logical to attach pathology, unofficially, to the duties of the professor of the practice of physic.

The removal of pathology and the addition of *materia medica* made Dr. Allen virtually Acting Professor of Therapeutics, *Materia Medica*, and Physiology, though his official title even as late as 1854 was Professor of Pathology and Physiology.

Prior to the report of 1850 the Regents had made three appointments to the medical faculty. In January, 1848, Dr. Douglass had been appointed Pro-

fessor of *Materia Medica*; he was also to discharge the duties of Professor of Pharmacy and Medical Jurisprudence; Dr. Abram Sager was named Professor of Theory and Practice of Medicine, and was to discharge the duties of such other professorship as might be prescribed (not the professorship of physic as specified in the Act of 1837). In July, 1849, Dr. Gunn was appointed Professor of Anatomy and was to discharge such other duties as might be required of him. Denton later seems to have acquired the title to the chair of the theory and practice of medicine, and of pathology. At the same time Dr. Sager, with his consent, was transferred to the chair of obstetrics and diseases of women and children. Hence, the members of the faculty at this time held the titles prescribed by law.

Dr. Silas H. Douglass, a native of New York state, began the study of medicine in the office of Regent Zina Pitcher, who continued to be a Regent of the University until 1851. He also served as physician under Henry R. Schoolcraft, the noted Indian scholar, who was also a member of the Board of Regents. Later, he assisted Dr. Douglas Houghton in his geological survey of Michigan (see Part III: DEPARTMENT OF GEOLOGY).

Dr. Douglass was made Assistant in Chemistry in 1844, without salary. After the death of Houghton in 1845 he continued in charge of the work, and in 1846 he became Professor of Chemistry, Mineralogy, and Geology; no mention was made of pharmacy, probably because of the statute of 1846, which was in effect.

There is no doubt but that Dr. Douglass, with or without the approval of his former preceptor, Dr. Pitcher, formulated the communication, signed by medical men and others, which, in January, 1847, was sent to the Board of Regents asking for the establishment of the

Medical Department. The communication started the movement which, a year later, resulted in the appointment of Dr. Douglass and Dr. Sager to the faculty of the new Medical Department.

In 1846 Douglass became Superintendent of Buildings and Grounds and, as such, he had much to do with the planning and erection of buildings on the campus. The Medical and Chemistry buildings as well as the Observatory and the South Wing of the Literary Department, were built under his supervision. Dr. Douglass served as elective dean of the Medical Department for nine years. His service in the University ended in 1877.

Dr. Abram Sager, also a native of New York state, had been Professor of Botany and Zoology since 1842. He was given, in 1848, the chair of theory and practice of medicine, and this was changed, in 1850, to obstetrics and diseases of women and children. Because of ill-health he resigned in March, 1874, and Dr. Edward S. Dunster was appointed to the chair. Sager became Emeritus Professor and resigned as Dean of the medical faculty in 1875. He had served ten years as elective dean.

Dr. Moses Gunn, as a medical student, had formed a strong friendship with Dr. Corydon L. Ford, the demonstrator of anatomy. He came to Ann Arbor immediately after his graduation and brought a cadaver which had been given to him by the Geneva Medical School. Dr. Gunn dissected the body before invited guests, thus performing the first dissection in Ann Arbor, if not in Michigan. In 1849 he was appointed, as the third member of the new faculty, to the chair of anatomy, with other duties to be assigned. He was then twenty-seven years old. His interests were primarily in surgery, but the absence of clinical facilities resulted in his devoting himself during this period to work in anatomy.

In 1853 he moved to Detroit, but maintained his position in Ann Arbor. The following year he became Professor of Surgery and held this title until 1867, when he resigned to accept the chair of surgery in Rush Medical College, Chicago, which position he held until his death. He acted as elective dean for only one year.

Dr. Jonathan Adams Allen, a descendant of Ethan Allen, was the fourth man to be added to the faculty. He was the youngest member, being only twenty-five years of age. His position was vacated in 1854 because of a controversy about student secret societies. Later he became president of Rush Medical College.

Dr. Samuel Denton, in 1837, was appointed a member of the first Board of Regents for a term of three years. He became the fifth member of the medical faculty. Dr. Denton served for three years as elective dean and died in Ann Arbor in 1860.

OFFICERS.—At the meeting of the Board of Regents in January, 1849, Dr. Zina Pitcher, as chairman of a special committee, presented a report embodying regulations for the organization of the Medical Department. On July 17, 1850, the same report, somewhat amended and designated as *Rules for the Government of the Medical College*, was adopted.

In the report it was specified that one of the professors was to be appointed annually by the faculty as president and one as secretary of the medical faculty. This was in line with the practice of the faculty of the Department of Literature, Science, and the Arts, which, since 1845, had designated its presiding officer as president.

The minutes of the medical faculty record the election of presidents in 1850-53 inclusive, and in 1855. Apparently, following the election of Dr. Henry

Philip Tappan as President of the University, in 1852, there was a transitional period in the use of the term "president" by the faculty. It is noteworthy, however, that the *Catalogue* of 1852-53 lists Dr. Samuel Denton as Dean, though he was elected president. This is probably the earliest recorded usage of that title in the University. In the minutes, however, the earliest references to the dean appear in November and December, 1853; and in March, 1854, Silas H. Douglass was elected Dean.

The deans continued to be elected annually by the faculty until 1891. The rotating principle was at first adopted, but not for long, as can be seen from the following list of elective deans: Abram Sager (ten years), 1850-51, 1859-61, 1868-75; Samuel Denton (three years), 1851-53, 1857-58; Silas H. Douglass (nine years), 1853-57, 1863-68; Moses Gunn (one year), 1858-59; Corydon L. Ford (seven years), 1861-63, 1879-80, 1887-91; Alonzo B. Palmer (eleven years), 1875-79, 1880-87.

With the growth of the University, it became apparent that the election of deans by the various faculties should be centralized and, accordingly, the rules of the Board of Regents were amended on July 17, 1889, making the deans thereafter Board appointees. By this action the deans received a status which was recognized in all University publications. The elective deans had not been given this recognition in the University *Calendar* or *Catalogue*, and, at times, their names were not even in the *Announcement* of the Department. Dr. Ford was the last of the elective deans, and upon his resignation Dr. Victor C. Vaughan was appointed Dean by the Board of Regents.

The deans appointed are as follows: Victor C. Vaughan (thirty years), 1891-1921 (resigned); Hugh Cabot, 1921-February, 1930 (relieved); Executive

Committee, 1930-33; Frederick G. Novy, 1933-February, 1935 (retired); Albert C. Furstenberg, February, 1935, to date.

In the interim following the termination of Dr. Cabot's deanship, the administration of the Medical School was entrusted to an executive committee consisting of Drs. James D. Bruce, Harley A. Haynes, Frederick G. Novy, Udo J. Wile, and Arthur C. Curtis, Secretary. The committee chose Dr. Novy as chairman, and in September, 1933, he was appointed Dean.

The executive committee, which had demonstrated its usefulness in the conduct of the affairs of the School, was continued, and similar committees were set up in the other schools and colleges of the University.

The *Rules* of 1850 provided that "the Faculty shall annually appoint one of their number Secretary." This rule was observed literally for a number of years, but on March 28, 1865, the Regents received a communication from the medical faculty asking the appointment of Douglass as dean and secretary with additional salary. An appropriation of \$200 was made for this purpose, but no official appointment was made, since that was probably considered to be a faculty matter.

His successor, Dr. Abram Sager, likewise held the two positions from 1868 to 1875, when he resigned. It is probable that Dr. Alonzo B. Palmer, who followed as Dean, also acted as secretary, but as the faculty minutes for 1875 to 1878 are missing, this cannot be verified. These minutes were either lost or destroyed in the fire of 1911, which actually damaged the book of minutes starting in 1878.

Elective secretaries, 1850-78: M. Gunn, 1850-51; J. A. Allen, 1851-53; A. Sager, 1853-55, 1861-62, 1868-75; C. L. Ford, 1855-57; A. B. Palmer, 1857-59, 1862-64, 1875-78; S. Denton,

1859-60; S. H. Douglass, 1860-61, 1865-68; S. G. Armor, 1864-65.

A revision of the bylaws, adopted in 1880, and subsequently revised in 1883, allowed the faculty to fill the position of secretary with one of the assistants to the professors. Since they received a salary, appropriated by the Board, they became actual University appointees. Appointive secretaries, 1878-1940: L. G. North, 1878-79; G. B. Ayres, 1879-80; P. E. Nagle, 1880-81; C. F. Dight, 1881-83; C. F. Chadbourne, 1883-84; G. A. Hendricks, 1884-85; W. A. Campbell, 1885-97; G. C. Huber, 1897-1911; C. W. Edmunds,² 1911-19; R. E. McCotter, 1919-29; J. L. Garvey, 1929-30; A. C. Curtis, 1931-35; H. M. Pollard, 1935-40.

BUILDINGS.—The report of Dr. Zina Pitcher, establishing the Medical Department of the University, was presented to the Board of Regents on January 19, 1848. Among other recommendations, it proposed the "erection of a Laboratory which by the expenditure of \$3,000 in addition to the material on hand can be completed so as to furnish all the room required for the Medical Department for many years to come" (*R.P.*, 1837-64, p. 392). The Board directed the building committee to procure a plan for a laboratory to be submitted for approval to the executive committee which was to select a site for the building. The executive committee appropriated \$3,000 for its erection and selected a site on the east side of the campus. When the Medical Department opened its doors to the first students the building cost was \$8,981. It was not until two years later that appropriations were made to complete the exterior of the building, bringing the total cost to \$9,991.84.

² C. W. Edmunds held the official title of Assistant Dean and Secretary from 1919 to 1924, but Rollo E. McCotter was designated Acting Secretary for this period.

During the session of 1852-53, there were 167 medical students registered. The inevitable crowding of "the narrow and ill ventilated rooms" used for dissection led the faculty, in March, 1853, to recommend to the Regents that a fee of three dollars be charged for the course in practical anatomy and that the attic be fitted up for dissecting purposes. In October, 1854, a committee of the faculty appeared before the Board and presented a plan for "certain alterations in the Medical College Building for the purpose of accommodating classes in dissections, and of providing apartments for the private researches of the Professors" (*R.P.*, 1837-64, p. 575). These alterations were probably made in the spring of 1855, since the sketch of the campus made by J. F. Cropsey in the summer or fall of that year shows the glass dome over the new dissecting room.

The original Medical Building was ninety-two feet in length, forty-two feet in width, and three stories high. The amphitheater had a seating capacity for 222 students. By 1860 the number of students had increased to 242, and by 1863 to 350. Because of the large number of students the Regents considered the question of raising the roof to provide extra space, but this was not deemed to be expedient. Another suggestion was to separate the classes into two divisions, the professors repeating their lectures. The report of the Board of Regents in September, 1863, pointed out that the Medical Building must be enlarged or its door closed to many students. In his address to the new Board, at its first meeting in January, 1864, President Erastus O. Haven stated that the "greatest immediate necessity" was a new or enlarged building for the Medical Department. The finances of the University at this time were too low to meet the expense of putting up the desired addition, but on February 17, 1864, the Board

authorized such construction as soon as \$10,000 had been provided from sources other than the treasury of the University. A committee was appointed to take such steps as would be expedient to raise the sum from the citizens of Ann Arbor. Noteworthy is the fact that Dr. Douglass was appointed to this committee and that the next day he introduced to the Board a committee of the citizens of Ann Arbor, who indicated that the sum of \$10,000 would be raised by subscription, with the expectation that this money would be repaid as soon as the legislature approved a general tax or a bond issue for that purpose. The money was soon subscribed, and on March 29, 1864, the Board let a contract for \$20,615 for the addition to the Medical Building and appointed Dr. Douglass to superintend the work. The legislature, a year later, legalized the bond issue by the city of Ann Arbor.

The addition to the Medical Building was sixty feet square and four stories high, with two large lecture rooms or amphitheatres, each containing comfortable bench seats for about six hundred persons. The top floor provided a new and enlarged dissecting room. The addition came very opportunely, since the number of students in 1864-65 rose to 414. Dr. Moses Gunn in 1866-67 delivered his last lectures in surgery to 525 students, probably the largest medical class in this country up to that time.

As long as the method of instruction was by lectures and recitations, the enlarged old Medical Building served its purpose. But by 1886 it was apparent that new rooms and more space were required for the rapidly developing sciences. The legislature was requested to provide funds for the erection of new laboratories. It responded, in 1887, by the grant of \$35,000, which obviously was insufficient to meet all the demands for space. Of this appropriation, the sum

of \$30,000 was allotted for the construction of a new building to house the Department of Physics and the newly created Hygienic Laboratory. This building was ready for occupancy in the fall of 1888. In the meantime, the Regents authorized the erection of an anatomical laboratory, which was occupied in 1887. This building was used as a laboratory until 1903, when it was turned over to the Buildings and Grounds service. The removal of anatomy from the old Medical Building allowed space for the Physiological Laboratory under the direction of Dr. Henry Sewall. At the same time, space was provided for histology and, a little later, for pharmacology.

All this change, however, was only temporary. The full impact of the advances in medical sciences was felt in the nineties, and enlarged and better equipped laboratories were needed. In 1901 construction was started on the West Medical Building. This was completed in 1903 at a cost of approximately \$137,000 and provided space for hygiene, bacteriology, physiological chemistry, anatomy, histology, and pathology. Physiology and pharmacology were taught in the old building until, with the construction of the Chemistry Building, space was made available in the old Chemical Laboratory, which was fitted up for them in 1909.

In 1923 construction of the East Medical Building was begun, and in 1925 physiology moved into its new quarters. In 1926 anatomy, histology, bacteriology, and the Pasteur Institute occupied quarters in this building, which was erected at a cost of \$858,283. The West Medical Building provided expanded space for hygiene, physiological chemistry, and pathology.

THE CURRICULUM.—The course of study as given at the time of the opening of the Department of Medicine and

Surgery consisted of four lectures daily, or twenty lectures or recitations a week, two hours in the morning and two in the afternoon. Saturday was reserved for the reading of theses and for clinical instruction.

Each of the five professors gave four hours of instruction a week. Dr. Allen presented materia medica; Dr. Douglass, chemistry; Dr. Denton, theory and practice; Dr. Gunn, anatomy; and Dr. Sager, obstetrics. In the first report it was stated that "quite a number of clinical lectures" were also given, and that sixty-four students entered their names among the dissecting classes.

The second *Announcement*, for 1851-52, mentions surgical operations performed before the class and states also that "during the past term numerous patients availed themselves of this privilege." While gratified by this demand on the part of the then small population in and about Ann Arbor, the faculty could not refrain from making adverse comments on clinical teaching as a "hasty walk through the wards of a hospital" and emphasized that "Clinical Instruction . . . is far better imparted in the walks of private practice . . . than can be done even in the best regulated hospital." This view was repeated in subsequent announcements, but was eliminated in that of 1856-57, the reason doubtless being that by that time the number of medical and surgical cases presenting themselves for treatment had increased, and the desirability of a hospital was perhaps recognized.

From 1857 to 1859, Dr. Zina Pitcher conducted a summer clinical course in the hospitals of Detroit. A surgical clinic was held by Dr. Gunn, in Ann Arbor, in 1858-59, on Wednesdays and Saturdays. These two days continued to be used for medical and surgical clinics until 1884 when clinics became an everyday routine (see Part V: UNIVERSITY HOSPITAL).

A striking feature of the program in 1850-51 was the requirement compelling the student to attend the same lectures again in the second year. This practice continued when the course was extended to nine months and even when it was lengthened to three years. Thus, the medical *Announcement* of 1889-90 stated "that attendance upon . . . lectures on the same subject a second time . . . is much more interesting . . . and profitable than the first; and hence they require students to attend lectures on all the leading subjects more than once." With the inauguration of the four-year course in 1890-91, this custom came to an end.

One of the requirements for graduation, as laid down in the *Rules* adopted by the Regents in 1850, was that the student "shall exhibit evidence of having pursued the study of Medicine and Surgery for three years, with some respectable practitioner of Medicine." This was interpreted as including two full courses of lectures. It was the accepted practice of that time for a student to serve as an apprentice with a physician, known as a preceptor. In the medical *Announcement* from 1877 to 1890, the preceptors' lists show that the role of the preceptor was diminishing with the passage of time, for members of the faculty were frequently named as preceptors. The formality of this requirement ceased with the organization of the four-year course.

In 1850 each candidate for graduation was required to write an original thesis which was to be read and defended before the class. These theses or essays were bound and duly deposited with the faculty. A thousand of them, more or less, now repose in the Michigan Historical Collections of the University. According to the *Announcement* of 1852-53 and that of 1875-76, the thesis could be written in English, German, French, or

Latin. With the nine months' course, effective October 1, 1877, and the prominence given to written examinations, the final thesis ceased to be required.

The *Rules* of 1850 make no mention of practical anatomy as a requirement for the M.D. degree. This may have been an omission to allay public feeling, or it may have been caused by the difficulty of securing enough subjects for dissection. In the first *Announcement* of the Department, 1850-51, it is stated that "arrangements have been made by which an ample supply of *matériel* for the department of anatomy has been secured." It was not until 1852-53 that the student, as a requirement for graduation, "must have been engaged in the study of Practical Anatomy." It thus became the first required laboratory course in the Medical Department. Two dissections were required in the first or second year, and these called for twenty to twenty-four weeks of daily laboratory work. After a few years all the work was placed in the first year. In 1941 a total of 433 hours were required in gross, applied, and topographical anatomy.

As already indicated, beginning with 1850 chemistry was a part of the didactic course. Optional laboratory work was offered early, but it was not until the Chemical Laboratory was built that the work was developed. Thus, in the medical *Announcement* of 1858-59, for the first time a course in Practical Chemistry was offered. This course covered qualitative analysis, urine analysis, and toxicology. When the laboratory was enlarged it became possible to instruct all medical students. Hence, in 1865-66, the requirements for graduation stated that the student "must have been engaged in the study of Practical Anatomy and Practical Chemistry." Thus, practical chemistry became the second required laboratory course.

This course as given in 1875-76 required ten to sixteen weeks of afternoon work. In 1881-82, both Qualitative Chemistry and Urine Analysis called for six weeks of afternoon work. In 1883-84 and thereafter, each course required twelve weeks. They became the second and third required laboratory courses. With the raising of the entrance requirements in 1909 to sixty hours of collegiate work, including general, organic, and qualitative chemistry, as well as physics, these subjects ceased to be a part of the medical curriculum. Chemistry had been taught in the Medical Department for fifty-nine years.

The beginning of histology may be said to go back to 1869, when Dr. Ford was given the additional title of Instructor in Microscopy. It is known that Ford gave demonstrations of histological structures. The recognition of the importance of the subject led to the establishment, in 1877, of the Physiological Laboratory, which in 1881 was renamed the Histological Laboratory. The practical course consisting of "fifteen lessons of afternoon work" was still elective in 1880-81, but became required in the following year, as a part of the new three-year schedule. It, therefore, became the fourth required laboratory course. Under the four-year curriculum, the laboratory work was extended to six weeks and in 1900-1901 to nine weeks. Subsequently, the laboratory work was greatly enlarged by the addition of embryology and neuroanatomy, so that by 1941, a total of 275 hours was required for graduation. Including lectures, the aggregate of hours amounted to 371.

With the appointment of Dr. Sewall in 1882, the lecture course in physiology became a required subject. An optional course in modern laboratory methods was offered by him in 1883. His successors also offered elective laboratory work. With increased facilities and

space, provided in 1904, laboratory instruction became required of all medical students. The course called for daily afternoon work for eight weeks, requiring twelve hours weekly in the second semester. The lectures and laboratory work, in 1941, totaled 271 hours.

Modern pathology had its beginning in the Medical Department when Dr. Heneage Gibbes entered upon his service in January, 1888. The lecture course was supplemented by an optional course, in practical pathology, open to senior students. The latter course became a required study for juniors when the four-year course went into effect in 1890.

A special course in the Pathological Laboratory, of twelve to fifteen weeks' duration, was listed from 1885-88, given, presumably, by Dr. Herdman. In addition to Practical Pathology a course in Practical Bacteriology was offered in 1889-90, at which time the department was housed in the basement of the Anatomical Building. Gibbes, as a member of the British Cholera Commission of 1885, had had some experience with the cultivation and staining of bacteria, but he had very little faith in their importance. The course was offered once again, in 1891-92, but it had no attraction owing to the extended course in bacteriology given in the Hygienic Laboratory.

In 1892 the Pathology Laboratory was moved to the recently vacated Homeopathic Hospital Building, where it remained until 1903. In 1895, the Department of Pathology was merged with the Department of Medicine. Dr. George Dock gave the lectures, and the laboratory work was assigned to Dr. A. S. Warthin, as Instructor in Pathology. With characteristic energy and enthusiasm he developed the work of the department. At the same time he himself rose rapidly in rank, becoming Professor of Pathology in 1903, which position he held until his death in 1931.

At first the laboratory work in pathology required daily afternoon work over a period of five weeks. In 1898 it was lengthened to eight weeks. In 1903 the laboratory was moved to its present quarters in the West Medical Building and the work continued to be given to the juniors until 1912, when it became a sophomore course. A total of 352 hours in lectures and laboratory was required in 1941.

The medical *Announcement* for three years, from 1885-87, listed a course of ten lectures on the Study of Bacteria. However, the first laboratory course in bacteriology was started in January, 1889, in the then new Hygienic Laboratory. It consisted of daily afternoon work for a twelve-week period. At first, it was optional for literary and medical students, but with the establishment of the four-year course in 1890, it became a required sophomore study. Though described in the text of the medical *Announcement* for 1889-91 as a course in bacteriology, in the schedule of studies it was listed first as Etiology and then for two years as Practical Hygiene. It finally appeared, in 1892-93, under its real name, Bacteriology. Actually, instruction in laboratory bacteriology began not, as sometimes stated, in 1892 but in 1889.

The lecture course in general bacteriology was given four times weekly throughout a semester from 1890 to 1938, when it ceased to be a requirement for medical students. The length of the course has varied from eight to sixteen weeks and has required from 160 to 320 hours.

The laboratory course in electrotherapeutics, which was optional under the three-year curriculum, became required when the four-year curriculum was adopted. It was taken by the second-year class, three hours daily for six weeks. In 1903 it was combined with the demon-

stration course and given in the third year. For two years after the death of Dr. Herdman in 1907 it was listed as an optional course and then was eliminated. At the same time "Electrotherapeutics" was dropped from the title of the chair held by Dr. Herdman since 1899.

The appointment of Dr. J. J. Abel marked the beginning of the Pharmacology Laboratory. Unfortunately, the space allotted for his work was limited. His successor, Dr. A. R. Cushny, established the Pharmacological Laboratory in two rooms in the old Medical Building in 1894 and gave the first course in practical pharmacology. This course was open to the third-year class as an elective and required four afternoons each week for a period of six weeks. The removal of histology from the building in 1903 provided additional space so that in the following year the laboratory work in pharmacology became a required eight-week course for the second-year class. In 1910, the department obtained better quarters when it moved to the old Chemical Laboratory. This space was doubled in 1925, when the Department of Physiology was transferred to the East Medical Building. The total of hours, lectures, and laboratory required in pharmacology, materia medica, and therapeutics in 1941 amounted to 192 hours.

The four-year curriculum was characterized by the separation of the preclinical and clinical courses. The first two years were devoted to lectures and laboratory work in the scientific subjects, and the last two years were given to clinical instruction. The demonstration courses in the third year, introduced into the curriculum in 1892, have in a certain sense carried on the idea of laboratory instruction. The consideration of these courses belongs, however, under the section dealing with the development of the Hospital.

The elective system in the Department of Literature, Science, and the Arts came into full operation in 1878, when it was extended to sophomores and juniors. One result of this new departure was the opening of a large number of courses to election by the students. Moreover, the number of elective courses increased from year to year. Courses such as physics, general and organic chemistry, and qualitative analysis, which were required studies in the Medical Department, could be elected by the prospective medical student. A little later, such a student was offered courses in hygiene and physiology as well as lectures and laboratory work in bacteriology, histology, and physiological chemistry. The student electing and completing these courses received full credit upon entering the Medical Department, thereby shortening his medical course by a year or more.

With the adoption of the four-year medical course it became evident that some formal control and recognition should be given to this method of meeting the requirements for graduation in the two departments. In 1892 a combined course was established, and the student was asked to register in the Department of Medicine and Surgery at the close of his third year in the Department of Literature, Science, and the Arts. The student thus had a double registration in order to meet the time requirement of four years in the Medical Department. This combined course was the first of its kind in the University, and for that matter, the first in the country.

At first all required courses for the first two years in the Medical Department, with the exception of anatomy, were listed as electives in the Department of Literature, Science, and the Arts. Later, although anatomy also became an elective, regional and surgical anatomy, electrotherapeutics, and

pathology did not. The student taking the combined course received the bachelor of science degree in four years and the degree of doctor of medicine two years later.

The combined course was also open to the candidate for a bachelor of arts degree, and the two degrees could be earned in six years. Thus, in the medical *Announcement* of 1902-3, it was stated that "a student who has completed sixty hours of work in the Literary Department is permitted to enter the Medical Department, and when he has obtained sixty more hours of credit in those subjects which are accepted by the Literary Department, he can obtain the degree A.B."

This held true until 1908, when an important change was made. The bachelor of science and doctor of medicine degrees were awarded, as before, upon the completion of six years of study. But the candidate for a bachelor of arts degree was required to have ninety or more hours of credit before registering in the Medical Department. Upon completion of the first year in medicine he was recommended for the bachelor of arts degree. The combined course for the two degrees, bachelor of arts and doctor of medicine, henceforth required seven years.

Candidates for the bachelor of science and doctor of medicine degrees were eligible for double registration upon the completion of sixty hours of credit and could obtain the two degrees in six years. In 1914 the candidate for these two degrees was required to have seventy-five hours of credit before enrolling in the Medical Department. This meant that the combined course covered six years and one or two summer sessions. The degree was designated as bachelor of science in medicine.

The combined course of bachelor of science in medicine and doctor of

medicine virtually ceased in 1931, when the admission requirements to the Medical School were raised from seventy to ninety hours. The student, therefore, was obliged to have ninety hours in order to enter upon the combined course. Upon the completion of the work of the freshman year he received the bachelor of arts or, at his option, the bachelor of science degree.

Those desiring to enter upon a combined course were required to have a uniform record of good scholarship. In 1921 this was expressed in terms of points. The applicant for the combined course was expected to have earned at least one and one-third times as many points as hours. In 1930 this requirement was raised to one and one-half points; and in 1937 to one and three-fourths points. In 1940, with the new grading system, this became two and three-fourths points.

A combined course in pharmacy and medicine leading to the degrees of bachelor of science in pharmacy and doctor of medicine was started in 1925, but was discontinued in 1931. The candidate was required to have ninety-six hours of credit before enrolling in the combined course. Upon completion of the first two years of the medical curriculum he was given the degree of bachelor of science in pharmacy.

THE FEES.—The Organic Act of 1837 specified that "the fee of admission to the University shall never exceed ten dollars; and it shall be open to all persons resident in this state . . . without charge of tuition . . . , and to all others under such restriction and regulations as said regents shall prescribe." Acting under this provision the Regents, in the *Rules* of 1850, required that every student entering the Medical Department pay ten dollars as an initiation fee. In the *Announcement* of the first session of the department this fee was designated as a matriculation fee. No other fee was

exacted of the student and no distinction was made between Michigan residents and nonresidents.

Since the matriculation fee was paid but once, it follows that the expense to the student taking the two-year course was but five dollars a year. By contrast, the fees prevailing in other medical colleges which were essentially proprietary ranged from sixty-five dollars to one hundred twenty-five dollars a term, the income being divided among the professors. At Michigan, however, the medical professors from 1850 to 1869 received salaries of one thousand dollars each, paid by the University out of its income. The one exception to the foregoing statement was Dr. Douglass, who taught students of the Literary Department as well as those of the Medical Department, and for the double duty he received a salary of fifteen hundred dollars.

The matriculation fee for Michigan residents has always been ten dollars. In the case of nonresident students it has changed first to twenty dollars and then to twenty-five dollars. The *Announcement* of 1852-53 required each student to make a deposit of one dollar to cover possible damages, the balance to be returned to him at the close of the term. This practice continued until 1862. In 1852 the fee for a diploma, which at that time was printed in English, was fixed at two dollars; in 1877 it was raised to ten dollars, where it remained until 1936. In 1878, at the request of the medical students, the diploma was printed in Latin.

A moderate but new source of income was instituted in 1858 with the incidental or annual fee of five dollars. This was required of all medical students. In 1866 it was increased to ten dollars. In 1874 this fee was again increased, but this time a distinction was made between Michigan residents and nonresidents: the former paid fifteen and the latter twenty dollars. From that time the an-

nual fee increased and a differential of ten dollars was maintained for many years.

In addition to the annual fees, the student, as the practical work developed, was called upon to pay laboratory fees, which eventually became considerable. At the same time the general expenses of the University increased. Accordingly, in 1916 the plan was developed of combining annual and all laboratory fees in one sum, which for Michigan students was set at one hundred dollars and for nonresidents at one hundred twenty dollars. In 1933 the annual fee was replaced by semester fees.

In 1936 the matriculation and diploma fees were absorbed in the semester fees, which for Michigan residents amounted to one hundred ten dollars, and for nonresidents, to one hundred seventy-five dollars, payable each semester. In 1940 the semester fees became one hundred twenty-five dollars for Michigan residents and two hundred dollars for nonresidents.

THE TERM.—At the time of the opening of the Medical Department in 1850, there was probably no medical college in the country which had a term exceeding four months in length. The Regents, having under consideration the question of a Medical Department, in January, 1847, recommended that the term of lectures be six months. In July, 1848, a committee was appointed to report on the prerequisites for admission to the Medical Department. This committee consisted of Dr. Zina Pitcher, as chairman, two additional Regents, Dr. Abram Sager, and Dr. Silas H. Douglass. In the committee's report of January, 1849, it was recommended among other things that "the course of Lectures and Recitations . . . shall occupy one entire year, to be divided into three terms, namely, one of fifteen weeks, one of fourteen weeks, and one of eleven weeks" (*R.P.*,

1837-64, p. 417). This would correspond to the forty-week session of the Department of Literature, Science, and the Arts.

In the meantime considerable opposition arose concerning the proposed long term, and Dr. Pitcher was obliged to yield. The *Rules* presented and adopted in July, 1850, provided that "the Course of Study . . . shall commence the first Wednesday in October and continue until the first Wednesday in April" (*R.P.*, 1837-64, p. 469).

For some reason the *Announcement* of the Medical Department for the first three years gave the end of the term as the "third Wednesday in April," probably to end with the spring vacation in the Literary Department. Actually, the first two commencement exercises were held on April 21, 1852. During the first year of President Henry P. Tappan's administration the exercises were also held in April.

As early as 1857 the medical faculty asked that the term be extended to nine months, but this request was tabled, and a year later the Board decided that the change was not expedient. In 1876 the Regents' committee presented a report recommending a full nine months' course beginning in October, 1877, and this was adopted.

In the *Announcement* of the Medical Department for 1877-78, full prominence was given to the extension of the course to nine months. It was also stated that students entering for the term of 1877-78 would be provided with a graded course of instruction covering three college years. This three-year course was clearly optional, since the requirement for graduation was "at least two full courses."

The optional three-year course paved the way for the next step, which was taken in 1879 and which provided for a full three-year graded course to be re-

quired of all students after October 1, 1880. Improved hospital facilities were provided, and laboratory work in anatomy, qualitative and physiological chemistry, and histology was required.

The next and final step was taken in 1887, when the faculty requested that the course be extended to four years of nine months each. The Board considered the request, presented by Dr. Palmer and Dr. Herdman, but it was temporarily tabled. The death of Dr. Palmer, in December, 1887, and the subsequent agitation about the removal of the department to Detroit, delayed action on the recommendation. However, in June, 1889, the Board acted, requiring "all students who enter [the Medical] Department after July 1, 1890, . . . to pass four years of professional study before graduation" (*R.P.*, 1886-91, p. 323). Ford had succeeded Palmer as Dean, but the work of reorganization devolved upon Dr. Vaughan. In June, 1890, the faculty presented a plan for a four-year graded curriculum which was adopted by the Board. In June, 1891, Dr. Ford resigned the deanship. He was the last of the deans to be elected by the medical faculty.

ADMISSION.—The committee appointed to frame regulations for the organization of the Medical Department provided the following entrance requirements in their report in 1849:

Every candidate for admission shall present satisfactory evidence of good moral character; shall pass an examination satisfactory to the Faculty in English Grammar, Geography, Arithmetic, Algebra, Geometry, and Natural Philosophy, and be possessed of such knowledge of the Ancient Languages as will enable him to read and write prescriptions with facility. (*R.P.*, 1837-64, p. 417.)

In the final *Rules* as adopted on July 17, 1850, the language follows that given in the first *Announcement* of the Medical

Department, for 1850-51, which evidently was published somewhat earlier. According to the *Announcement*:

Every candidate for admission shall present to the Faculty satisfactory evidence of good moral character, and also of such literary attainments as have been recommended by the National Medical Association, viz:—"A good English education, the knowledge of Natural Philosophy, the Elementary Mathematical Sciences, and such an acquaintance with the Latin and Greek languages as will enable the student to appreciate the technical language of medicine, and read and write prescriptions." (*Primary Announcement of the Course of Lectures in the Medical Department . . . , 1850-51, p. 8.*)

In order not to frighten away prospective applicants the *Rules* provided that "these literary requirements shall not be insisted upon for the first two years, until the student becomes a candidate for the degree of M.D." This latter provision was stretched somewhat, for in the third to the ninth *Announcement* the rule regarding admission stated that "each candidate for admission . . . must be provided with satisfactory evidence of good moral character, and, if a candidate for graduation, also of such literary attainments as have been recommended by the National Medical Association. . . ." Under this requirement any person "of good moral character" could enroll in the Medical Department for at least a year, and then if he could not qualify for further study toward the degree he was free to go to another college or he could cease the study of medicine altogether. That this was actually the case for many years is seen in the great disproportion between the number of students enrolled and the number of graduates. As early as 1852, in connection with the request to have the graduation fee lowered from five to two dollars, the awareness of the faculty in this matter is indicated in its report by the state-

ment "that the tendency will be to convert this College into a merely Preparatory School for students who wish to graduate in other Colleges." Similarly, the request of the faculty, in 1857, for an extension of the course from six to nine months may have been actuated by the fact that students upon completing the first year's work in March could enroll in some other college and even receive a medical degree a few months later.

In the *Announcement* of 1861-62 the admission requirements were slightly modified to read:

Every candidate for admission shall exhibit to the Faculty satisfactory evidence of a good moral and intellectual character, a good English education, including a proper knowledge of the English language, and a respectable acquaintance with its literature, and with the art of composition; a fair knowledge of the Natural Sciences, and at least, of the more elementary Mathematics, including the chief elements of Algebra and Geometry, and such a knowledge of the Latin language as will enable him to read current prescriptions, and appreciate the technical language of the Natural Sciences, and of Medicine.

This requirement did not call for an oral or written examination. As a matter of fact no medical college in the country, then nor for many years afterward, required an examination for admission. The requirement continued in force until 1874.

The question of requiring examinations of candidates for admission to the professional schools, Law and Medicine, came up in 1872, and the Regents directed "the Professor . . . [to] make such inquiries of the applicants . . . , as will enable them to report understandingly upon the actual extent of preliminary education possessed by such applicants." The result of that inquiry is unknown, but, in June, 1873, the State Medical Society, through a committee,

conferred with the Board, and the matter "was referred to the Committee on the Medical Department, together with the medical faculty."

After lengthy discussions the admission requirements were strengthened in October, 1874, and presumably included written examinations. The medical faculty in their annual report for that year reported a "considerable increase of numbers notwithstanding the rejection, for deficiency in preliminary preparation, of a number of applicants." The following year the report of the faculty indicated "more than a dozen rejections." President Angell, in his report for 1874-75, stated that "an examination for admission was held. Though the requirements were very slight, it was found necessary to reject some of the applicants, whose ignorance was profound." He went on to express his belief "that no other Medical school in the Union yet holds an examination for admission." Under the circumstances the medical faculty could justly claim this to be a "pioneer movement in Preliminary Examinations in American Medical Colleges."

The requirements for admission, as given in the medical *Announcement* for 1875-76, were formulated by the committee referred to, and as such were quite different from those of the preceding twenty-five years. For the first time diplomas or certificates of graduation from colleges, academies, and high schools were officially recognized. Moreover, the examinations of those not provided with such credentials were to be in writing. Thus, the requirement states that, in addition to being eighteen years of age and of good moral character, "unless already a matriculant of the University or a graduate of some respectable college, academy or high school" every candidate was to take an examination in writing, which was to "cover the ordi-

nary branches of an English education." Until 1889 the examinations were written, but with the announcement of the four-year course in that year, although required, they no longer had to be taken "in writing." In 1875 Latin ceased to be required, but in 1892, two years after the extension of the course to four years, Latin became a required subject, and it continued to be such until 1936.

A change in the admission requirements was announced in 1878 which may have lowered the standard of 1875. Thus, "graduates or advanced members of some academy or high school" were exempted from taking the examination. Apparently, a full academy or high-school course was not considered necessary; however, in 1889, this was changed to "graduates of literary colleges of good standing, graduates of the schools approved as diploma schools in the Literary Department and of other High Schools of equal standing."

The statement concerning the written examination of 1878 was more explicit than that of 1875 as to subjects required: "Arithmetic, Geography, History, Forms of Government and current events" and the candidate was "particularly . . . required to correct imperfect English." These subjects were amplified in 1885 and the first science, elementary zoology, was added.

The requirements of 1892, eight in number, were more exacting than at any previous time. Emphasis was placed on subjects considered essential to the proper study of medicine rather than upon the possession of a diploma.

The minimum age limit for admission, which in 1875 had been set at eighteen years, was lowered to seventeen in 1893, doubtless to meet the twenty-one years' requirement for graduation. It ceased to be mentioned after 1900.

In 1897, instead of a classical or Latin diploma, a formal certificate was re-

quired of the high-school principal showing that the candidate had passed in certain prescribed subjects. The applicant was exempted from examination only in those prescribed subjects covered by the certificate. He could take the examination in the uncertified subjects, or he could be accepted with a condition, which had to be removed within a year. No student was permitted to have more than two entrance conditions.

In 1903 graduation from an approved high school or its equivalent became mandatory. For unconditional acceptance, the applicant was expected to have had two years of collegiate instruction in addition to his high-school course. High-school certificates continued to be used until 1909, when the applicant for admission was required to have the equivalent of sixty hours of credit (two years of collegiate work), and also to have credentials showing "an acquaintance with Latin and a fair reading knowledge of either German or French, and a year of collegiate work in Biology (Zoology and Botany), Chemistry and Physics."

The requirements of 1909 practically called for two years of collegiate work, but it was not until 1912 that the definite announcement was made that "no student will be admitted to the school who has not completed two years of college work, in addition to graduating from an approved High School, or its equivalent." The applicant was, moreover, required to have credit for the five subjects prescribed in 1900 and also to have had organic chemistry. The subject requirements have undergone little change since 1909.

GRADUATION.—The *Rules* of 1850 prescribed the conditions required for graduation. The first was that "candidates for graduation shall announce themselves as such at the close of their first course or the commencement of their second, and shall be examined upon

the subjects of Anatomy, Physiology, *Materia Medica*, and Chemistry." This was known as the primary examination. They were further required "to write a thesis upon some Medical or Surgical subject, once in two weeks, which thesis shall be read and defended before the class, on such Saturdays as may be appointed by the Faculty."

In the *Primary Announcement of the Course of Lectures* (p. 9) it was further specified:

In order that any student may be recommended for the Degree of Doctor of Medicine, he shall exhibit evidence of having pursued the study of Medicine and Surgery for the term of three years, with some respectable practitioner of Medicine; (including lecture terms;) must have attended two full courses of lectures, the last of which must have been in the Medical Department of the University of Michigan—must be twenty-one years of age—must have submitted to the Faculty an original Thesis, in his own handwriting, on some Medical subject; and have passed an examination, held at the close of the term, satisfactory to the Faculty.

It was also ruled:

An allowance of one year . . . may be made in favor of graduates of the Department of Science and Arts, and of other respectable Literary Colleges, and respectable practitioners, of four years' standing, may be admitted to the degree of M.D., by attendance upon one Course of Lectures—on passing the requisite examination. (*Rules*, 1850, p. 9.)

The provision in the *Rules* granting exemption of one year to college graduates continued in force until 1858, when it was changed to "six months," and this was continued until 1880, at which time the extension of the course to three years of nine months each went into effect. Thereafter, the matriculant received credit for whatever medical courses he may have taken as a literary student.

The *Rules* of 1850, while stating that

"all degrees shall be conferred by the Board of Regents, upon the recommendation of the Medical Faculty," contain no mention of a diploma. However, the minutes of the faculty, November 23, 1850, show that Dr. Denton and Dr. Sager were appointed as a committee to draft a form for a diploma. This draft, in English, was adopted and sent to the Board, which, in January, 1851, entrusted to Dr. Zina Pitcher the duty of procuring the engraving of the diploma and "to make such alterations in the style and embellishment thereof as he may find proper." The cost of engraving the diploma and making twenty impressions was \$250.

In 1875 Dean Sager, reporting on the complaint of the students that the old diploma plate was worn out, stated "that the vignette designed to represent the Medical College and surroundings . . . conveys a very imperfect and inadequate idea" of their present condition. The students asked for a new plate and new diplomas. The Board decided not to procure a new plate, but recommended that an appropriation of not more than \$200 be made to represent on the plate the University buildings of that time. This recommendation was adopted, but a month later the action was rescinded, and the Board directed that the representation of the Medical Building on the plate be stricken out.

The Board, in 1878, received a petition from the medical students asking that the diplomas thereafter be printed in Latin and offering to give \$150 toward procuring a new plate. This request was granted provided that the cost to the University did not exceed fifty dollars. The sum of ninety dollars was received from medical students as part payment toward a diploma plate.

In the *Announcement* of 1852 a new requirement for graduation was added which stated that the candidate "must

have been engaged in the study of Practical Anatomy." A further slight change made at this time was that the thesis had to be "composed and written by [the candidate] himself." In 1865, as a result of the enlargement of the Chemical Laboratory, the above requirement was made to read "must have been engaged in the study of Practical Anatomy and Practical Chemistry."

With the above slight additions, the requirements were the same in 1875. It was stated, however, that the candidate was required during the course, "to submit to written examinations by each Professor." The final thesis could be written in English, German, French, or Latin.

In 1877 the transition from the old requirements began as a result of the extension of the course from six to nine months and the initiation of the optional three-year course, which went into effect in 1880. In the *Announcement* for that year it was stated that in addition to the examination required, the candidate "may be called upon to write upon some theme . . . required to be defended before the class. In consequence of the prominence given to written examinations through the Course, no graduating thesis will be required." The old phrase "of having studied medicine three years" is retained but that of "with some respectable practitioner of medicine" is deleted, although the names of the preceptors continued to be published until as late as 1890.

In 1851 the faculty decided upon a ballot system. Each professor was given five votes, making a total of twenty-five possible votes. The passing grade was fixed as sixteen votes, 64 per cent. Of the seven candidates who presented themselves, one received six votes and accordingly was rejected. The remaining six candidates received from sixteen to twenty-five votes. The one to receive the

unanimous vote was Dr. Robert C. Kedzie, who, later, as professor of chemistry in the Michigan Agricultural College, became very prominent in sanitary work.

In later years each professor was given seven votes. The full vote of six professors in 1878 was therefore forty-two, and the passing grade was twenty-six votes, 62 per cent. The candidates received from twenty to thirty-seven votes; the latter, or highest, vote was received by Dr. Victor C. Vaughan.

In 1880 the candidate who received the highest number of votes, fifty-one out of a possible fifty-six, and thus graduated at the head of his class was Dr. José Celso Barbosa of San Juan, Puerto Rico, the first student to come to the University from that island. One of the youngest graduates was Dr. William J. Mayo, who lacked one day of being twenty-two at the time of his graduation in 1883.

Probably with the object of developing the best possible relations with the physicians of the state, the Regents in 1878 decided to appoint annually two of the physicians to serve as examiners. They were to act with the medical faculty at the examination of candidates for graduation and were to report, jointly with the faculty, the names of such candidates as were deemed worthy for graduation. These examiners sat with the faculty and each had the usual seven votes. Their names were listed in the announcements of the department from 1880 to 1883.

Dr. William Brodie, of Detroit, and Dr. H. O. Hitchcock, of Kalamazoo, were the first examiners to be appointed. They were succeeded by Dr. A. F. Whelan, of Hillsdale, and Dr. E. P. Christian, of Wyandotte. The next and last to be appointed was Dr. W. Parmenter, of Vermontville.

The method of balloting upon candi-

dates for graduation continued into the late eighties. With the increase in the number of laboratory and lecture courses, a card system for keeping records was devised by the secretary, and this procedure, greatly developed, has been followed ever since. It doubtless was responsible for the discard of the old procedure of balloting on each candidate.

The requirements for graduation under the four-year course, as set forth in the medical *Announcement* of 1890-91, were brief and explicit. The candidate, in addition to being "twenty-one years of age" and of "good moral character," requirements handed down from the beginning, "must have completed the required courses in laboratory work, . . . must have been engaged in the study of medicine for the period of four years, including time spent in attendance upon lectures. He must also have passed satisfactory examinations on all the studies included in the full course of instruction."

The reporting of examinations as "Passed," "Conditioned," or "Not Passed" had been the custom for some years, but the "Rules" were not published in the medical *Announcement* until 1892. The condition had to be removed within a year, otherwise it became "Not Passed." These rules were modified in 1903 by the addition of "Absent" and "Incomplete." The change to letters, still in use, came in 1915, when the results of examinations were reported as: A, excellent; B, good; C, fair; D, conditioned; E, not passed.

In 1931 the candidates for graduation, in addition to having completed all required work and having passed all course examinations, were required to take a comprehensive examination covering all subjects in the curriculum. This requirement has continued in force up to the present time.

In contrast to the five hundred hours of instruction by didactic lectures, required in 1850, the schedule of instruction in 1940 called for 4,294 hours of lectures, demonstration and laboratory work, and clinics.

ENROLLMENT.—In his first report on the Medical Department, in 1848, Dr. Pitcher said "that in two years from the establishment of a Medical Department of the University there would at least fifty students matriculate annually, the

the latter took the lead and held it until 1863, when it was again outnumbered for another period of four years. In 1867-68 the two departments tied, each having 418 students. Table I gives a summary of the enrollment in the Medical Department. The first high peak, of 525 students, was reached in 1866-67, probably because of the post Civil War influx. At the time this was the highest enrollment in any medical school in the country. The second high peak, of 556 students, in

TABLE I
SUMMARY OF MEDICAL SCHOOL ENROLLMENT, 1850-1940

Year	Enrollment			Graduates	
	Men and Women	Women	Special Students	Men and Women	Women
1850-51	91	..	5	6	..
1855-56	152	..	3	30	..
1860-61	241	..	..	44	..
1865-66	467	..	2	74	..
1870-71	315	18	..	82	1
1875-76	312	37	..	93	15
1880-81	384	43	2	101	10
1885-86	327	61	2	83	19
1890-91	371	59	4	102	16
1895-96	440	68	14	52	13
1900-1901	556	41	7	77	7
1905-6	367	26	2	67	6
1910-11	260	14	6	56	2
1915-16	324	22	2	63	7
1920-21	449	36	1	71	6
1925-26	541	36	5	112	7
1930-31	574	48	4	163	14
1935-36	481	37	8	117	7
1940-41	466	36	6	117	11

number of course constantly increasing." It must, therefore, have been a gratifying surprise to the faculty to find ninety-one matriculants when the new department began its first session. Moreover, this number was appreciably larger than that in the Department of Literature, Science, and the Arts, which had an enrollment of sixty-four.

During the first four years the enrollment in medicine exceeded that in the Department of Literature, Science, and the Arts. But, in the session of 1854-55,

1900-1901, marks an adaptation to the high-school requirements for entrance. The third high peak, of 664, came in 1928-29, when, as yet, no limitation on numbers had been set. It was the next to the highest attendance in the medical schools of the country. The ninth decade, that of the "depression," marked the beginning of the limitation of enrollment with the object of securing the best possible clinical instruction. The number of students in 1940 was under 500.

The *Rules* of 1850 (p. 6) provided that

"clergymen, members of the legal profession, and graduates of other respectable medical institutions, may be permitted to attend the course of instruction as honorary members of the Medical Department." The enrollment under this provision is given in Table I in the column designated "special students." The custom apparently ended in 1866. Of the honorary members, eight were clergymen, twelve were medical graduates, and two were without designation. As the work in the laboratories developed, students not enrolled in the regular medical course applied for instruction in certain fields and were designated as "special students."

The students who enroll in any one year, obviously, do not all remain in school. Various causes contribute to the decrease in the number of students in any one class. A very important factor during the first three decades was the lack of clinical facilities, which caused students to migrate to other schools in large cities. This migration was lessened somewhat by the erection of the Pavilion Hospital on the campus in 1876; it decreased still more after 1892, when the then new Hospital was occupied, and soon ceased altogether. Another possible reason for the decrease recorded was that the student who had taken one year in medicine could go out and practice the art without having a medical diploma, since, at that period, there were no legal requirements.

Scholastic and financial difficulties, as well as illness and unfitness, have always been factors in decreasing the number of a graduating class. In general, it may be safely predicated that about one-third of those entering school in a given year do not graduate at the end of the four-year period, although some of these may return and graduate later.

In the first session of the department, in 1850-51, the class was made up

largely of Michigan students. They constituted 78 per cent of the attendance, which is a larger percentage than that of any subsequent class. Seventy-one Michigan students were enrolled as against twenty from six other states. Evidently, the existence of the new medical college was as yet hardly known outside the state.

In 1855 students from other states, excluding foreign countries, made up 77 per cent of the total enrollment, an all-time high record. In the peak year of 1866, with an enrollment of 525, Michigan students numbered 120 or only 23 per cent of the total. It was not until 1921 that the Michigan residents regained the majority which they had lost seventeen years before. In that year they had 51 per cent, with 281 residents out of a total of 552 students. From that time the Michigan residents, with slight variation, have led in the enrollment. In 1939 they reached 75 per cent, almost the same as in 1850.

During the first twenty-five years, apart from Canada, which in 1864 had fifty-four students (13 per cent of the total), the enrollment from foreign countries was very limited. The records show only one each from England, Ireland, Scotland, France, Germany, Russia, and Jamaica, and two each from Hawaii and Liberia—a total of eleven entrants from nine countries. It may be assumed that the students from all but the last three countries were immigrants and that those from Hawaii were probably the sons of American missionaries.

A steady enrollment of foreign students began in 1876. Since that time there has not been a year without representation from some foreign country.

The missionaries began to send women for medical training as early as 1878, when Burma was represented. Later, Chinese and even some Japanese came under like auspices. The most significant

help, however, came from the Levi Barbour Oriental Girls' Scholarships, which were established in 1917; these have served to train women from many Asiatic countries. Incalculable benefits have come from this most generous foundation.

WOMEN STUDENTS.—With the adoption of the resolution permitting the attendance of women in 1870, in October of that year eighteen women entered the Medical Department, and one of them, Miss Amanda Sanford, of Auburn, New York, was graduated in the following March. She was the first woman to graduate from the University and from the Medical Department. (It should be stated that she was followed, within a half hour, by Miss Sarah Killgore, who received the degree of bachelor of laws.) Three months later, two women, Amelia and Mary Upjohn, were given the degree of pharmaceutical chemist. Thus, four women were graduated from the University in 1871.

In view of the applications from women for admission to the Medical Department early in 1870, the medical faculty presented a memorial to the Regents. They stated that "in their judgment the medical co-education of the sexes is at best an experiment of doubtful utility, and one not calculated to increase the dignity of man, nor the modesty of women." They suggested, however, that the faculty was "willing to give a full course of medical instruction to females, at any convenient time, and for a suitable compensation" (*R.P.*, 1870-76, pp. 36, 37).

Three months later a special meeting of the Board was called for the express purpose of considering the education of women in the Medical Department, and Dean Palmer, in a brief report, reaffirmed the views of the faculty:

Declaring their clear conviction of the inexpediency of the co-education of the sexes

... having in view not only the indelicacy of such common instruction . . . , but also . . . the difficulty of restraining improprieties of deportment, and checking insubordination, in large classes of mixed students . . . , [the faculty recommended] a complete course of instruction separate, and in all respects apart from that given to the other class. (*R.P.*, 1870-76, pp. 51-52.)

They also agreed to accept a remuneration of \$500 for each course. This plan was then adopted. As a result of this action two separate courses of instruction were given and hence each professor gave eight lectures a week. In 1871-72 thirty-five women were enrolled in the department, indicating "a probable final and complete success."

The first and partial break in the rigid requirement of two separate courses occurred within a year, when Dr. Douglass asked to be relieved from the duty of repeating his lectures in chemistry to the ladies. This request was granted but with the proviso that he "so arrange his lectures . . . as to avoid introducing the students of both sexes into a common lecture room." Just how this was done is a matter of conjecture. It may be surmised that the women students were given seats in the preparation room where they could hear, and yet could not be seen by the male students.

In March, 1874, one of the Regents offered a resolution "that hereafter there shall be no separate lectures given to women in the Medical Department, and that the extra compensation . . . shall be discontinued." In the report on this resolution it was pointed out that the faculty assured the committee "of the impracticability of conducting certain lectures and experiments in the presence of mixed classes, and that any further attempt in this direction would seriously damage the Department." The committee also stated that the question of a reduction in salary was equally impractic-

able, and recommended that the matter be referred "to the judgment and discretion of the Medical Professors."

It was not until 1881 that the subject came up again, this time on the initiative of the faculty. They asked for discretionary power on the subject of separate lectures to the male and female students of the department. The request was granted, and from that time on the segregation of the classes practically ceased.

When it came to seating the women, then often referred to as "hen-medics," in the amphitheaters of the old Medical Building, the faculty found it desirable to bar off a section to the left of the lecturer by a broad red-painted band extending from the pit to the top row of seats. Violation of that border line by either sex was unthinkable. With the erection of the West Medical Building in 1903, the red line disappeared and the co-ed was free to take a seat wherever she wished. For many years practical anatomy was pursued by the two sexes in separate rooms.

The *Announcement* in 1883, regarding instruction of women, added: "And such of the lectures and demonstrations as it is thought by each member of the Faculty not desirable to be presented to the combined classes, are given separately; but in most of the lectures, in the public clinics, in the chemical laboratory, and in various other class exercises, it is found that both may with propriety be united." This statement, somewhat shortened, has been handed down through the past sixty years.

THE LABORATORIES

CHEMISTRY.—With the completion of the original Medical Building a limited space became available for practical instruction in chemistry. The first laboratory course in chemistry, in toxicological analysis, was given in 1854 in the Medi-

cal Building by Dr. Silas H. Douglass. The demand for this work was such that Douglass felt it desirable to provide instruction after the end of the medical term. In this he gained the support of President Tappan, who in his report in December, 1855, announced that a "summer course in Practical and Analytic Chemistry" would begin the first week in April. It may be assumed that the course was intended primarily for medical students desiring such instruction, and that it was given in 1856 and 1857. This was only a temporary expedient.

In this connection it may be well to point out that another summer course was put into effect in 1857. In that year, Dr. Zina Pitcher recommended that clinical instruction be given in one of the two hospitals in Detroit and that, in order not to conflict with the claims of analytical chemistry, it should begin in June and continue until the end of September. He was appointed Clinical Instructor and the work was given in St. Mary's Hospital, which, at that time, had an average of fifty to seventy-five patients. The course in 1857 was taken by nine students; that in 1858 had thirteen students. Dr. Pitcher resigned in the spring of 1859, and the attempt at summer instruction came to an end.

How long the summer course in chemistry continued to be given is not clear, but it probably was discontinued when the Chemical Laboratory was built. At all events these two courses were modest precursors of the summer session which came about forty years later.

The erection of a chemical laboratory had been under consideration by the Regents in the forties, but the organization of the Medical Department delayed the project. It came to the front in 1855, when President Tappan pointed out the need of a chemical laboratory. The Regents responded in May, 1856, by

appropriating \$2,500 for such a building, and later four additional appropriations were made, so that up to the end of June, 1857, the sum of \$6,459 had been voted. President Tappan, in his report for 1856 and 1857, referred to the new analytical laboratory as "the most complete and efficient in our country." It was situated just west of the Medical Building, probably to accommodate the large number of medical students.

The laboratory was a small building, with only twenty-six tables, but to Dr. Douglass it was the realization of the dream of a decade. It was the first chemical laboratory in a state university. Within a year after its completion, realizing the need of gas in chemical work, Dr. Douglass organized the Ann Arbor Gas Company. He was permitted in June, 1858, to lay gas pipes from the street to the laboratory at his own expense and to charge students for the use of gas. Six months later, permission to use gas in the Medical Building was granted under like conditions. The title to all gas pipes laid upon the University grounds and in its buildings was acquired by the University, in 1860, by the payment of \$350 to Dr. Douglass.

With a steady increase in enrollment there came an ever-increasing demand for practical instruction in chemistry. As many as seven additions or alterations were made to the laboratory, first in 1861, and later in 1866, 1868, 1874, 1880, 1889, and 1901. For years, most of those who took practical courses in "the Laboratory," as it was generally known, were medical students. Thus, in 1871-72, of the 267 students who took lectures and laboratory in chemistry, 195 or 73 per cent, were medical students. At that time there were 135 tables. In 1878 and 1879 the Chemical Laboratory had 374 students, twenty-eight of whom were from the Department of Literature, Science, and the Arts and 346 from the

Dental, Medical, and Pharmacy departments. After the last addition to the old building, in 1901, there were 362 tables available. The continued increase in students called for the construction of an entirely new building, with 634 tables, which was occupied in 1909 (see Part III: DEPARTMENT OF CHEMISTRY).

With the opening of the Medical Department, in 1850, instruction was given by five professors, each of whom taught four hours a week. Chemistry was co-equal with the four medical subjects. As the Chemical Laboratory developed, emphasis was placed on practical instruction in qualitative analysis, toxicology, and physiological chemistry.

General Chemistry including physics was given by Dr. Douglass until 1877. The work was then taken over by John W. Langley, who taught it until 1889 when he resigned. His successor, Dr. Paul C. Freer, greatly developed the course. Dr. Samuel Lawrence Bigelow succeeded to the chair. The subject became an entrance requirement in 1900.

After 1889 the instruction in physics was given for medical students by an instructor in general chemistry. Thus, Dr. D. M. Lichty taught the course from 1891 to 1901. It was then given by Dr. John O. Reed, of the Department of Physics, until 1906. The subject had been a prerequisite for entrance to the Medical School since 1892.

Qualitative Chemistry was at first optional, but became required for medical students in 1866 and so continued until 1900, when it became an entrance requirement. This laboratory course at first required daily afternoon work for seven weeks and later was extended to twelve weeks.

With the appointment of Dr. A. B. Prescott as Assistant Professor of Chemistry and Lecturer on Organic Chemistry, in June, 1865, the first separate course in organic chemistry was given.

He continued to lecture on this subject to medical students up to the time of his death in 1905. The course was then continued by Dr. Moses Gomberg who taught it until 1909, when it became a premedical requirement.

PHYSIOLOGICAL CHEMISTRY.—Laboratory instruction in medical chemistry, such as urine analysis and toxicology, began very early. Such work was optional and was carried on in the old Medical Building. With the erection of the Chemical Laboratory more students availed themselves of the opportunity. The report of the Chemical Department for 1871-72 states that toxicology was taken by eighteen students and "urology" by 143 students. Thus, of the 350 students in the Medical Department, nearly one-half took the latter course, the instruction being given by Dr. P. B. Rose, a graduate of the medical class of 1862. Rose had served as an assistant in the Chemical Laboratory in 1861-63 and 1866-75.

In October, 1875, Dr. Rose was appointed Assistant Professor of Physiological Chemistry. This probably was the first use of that title in this country. Because of a laboratory defalcation Rose was suspended on December 21, 1875 (see Part I: THE DOUGLAS-ROSE CONTROVERSY).

In 1877, a joint committee of the legislature made an "investigation" and concluded that Rose was innocent and asked for his restoration. The request was repeated in February, 1879, and the Board thereupon appointed him Assistant Professor of Physiological Chemistry. In June of that year he was named Assistant Professor of Physiological Chemistry and Toxicology and Lecturer on Renal Diseases.

A decision of the Supreme Court, in January, 1881, exonerated Dr. Douglas, the Director of the Chemical Laboratory, and awarded him a judgment

against the University. Thereupon, Dr. Rose resigned, as of October, 1881.

The immediate result of the suspension of Dr. Rose, in December, 1875, was the appointment of Victor C. Vaughan as temporary assistant in the Chemical Laboratory. In June, 1876, he was given the permanent appointment, which he held until 1879. At the same time, having obtained his Ph.D. degree in 1876, he enrolled in the fall of that year in the Medical Department and received his M.D. degree in 1878.

In 1879 Dr. Vaughan was made Lecturer on Medical Chemistry and Assistant in the Chemistry Laboratory. In November, 1880, he became Assistant Professor of Medical Chemistry and Assistant in the Chemical Laboratory. In 1883 he was made Professor of Physiological and Pathological Chemistry and Associate Professor of Therapeutics and Materia Medica.

On the creation of the Hygienic Laboratory in 1887, Vaughan was given the title of Professor of Hygiene and Physiological Chemistry, and he lectured on these subjects until his resignation in 1921. Dr. Vaughan was Director of the Hygienic Laboratory from 1887 to 1909. He gave the laboratory work in physiological chemistry until 1891, when it was taken over by Frederick G. Novy, who conducted it until 1921. Dr. E. B. McKinley carried on the laboratory work for the following year, when Dr. Howard B. Lewis was appointed Professor of Physiological Chemistry. In 1935 the name of the department was changed to Biological Chemistry.

When Vaughan began to teach physiological chemistry only two poor microscopes were available. In 1876 he obtained six more, and in 1879 another lot of six was added. This was at a time when microscopical work was all but unknown. The committee on microscopes reported in June, 1882, that at that time

there were 104 microscopes in the University, and forty-two of these were reported by Dr. Vaughan.

With the 1880 addition to the Chemical Laboratory, physiological chemistry acquired a large room with forty-eight tables and a room for microscopes and microscopical examinations. A room was also provided for Dr. Vaughan. In 1903 the work was transferred to the present West Medical Building, where it is still given.

THE ANATOMICAL LABORATORY.—This was actually the first laboratory on the campus. In July, 1849, a year before the Medical Department opened, the Regents appointed Dr. Moses Gunn to be Professor of Anatomy and to discharge such other duties as might be prescribed. He was then twenty-seven years old and the only candidate for the position. As his real interest was in surgery, although he lectured on anatomy, the practical work was turned over to a demonstrator.

In July, 1851, Dr. Edmund Andrews was appointed Demonstrator of Anatomy and Superintendent of Grounds. Three years later he became Professor of Comparative Anatomy and Demonstrator of Human Anatomy. It may be inferred from this title that the course in practical anatomy was based to some extent on animal dissection. Andrews was capable and energetic and as Superintendent of Grounds he devised a comprehensive plan for the planting of trees on and around the campus. At that time the campus, as well as the bordering streets, was treeless. His plan called for 1,640 trees. In June, 1855, he resigned his position and went to Chicago, where he soon rose to distinction.

As early as July, 1851, the Regents had passed a resolution stating "that no anatomical subject shall be introduced into the Medical Building or brought upon the grounds of the University ex-

cept through the agency of the Professor of Anatomy, and any student of the University violating this resolution shall be expelled" (*R.P.*, 1837-64, p. 497). It may be inferred from this that during the first year medical students had attempted to act as "resurrectionists." Without doubt, during the next twenty-five years, as many stories seem to indicate, material was obtained from outside sources. It may be assumed that from the beginning an important duty of the demonstrator of anatomy was to supply material for dissection. The financial reports included in the early *Regents' Proceedings*, with one exception, throw no light upon the cost of such supplies. This exception perhaps entered the records inadvertently. For the session of 1861-62, the Demonstrator of Anatomy listed: "To expense of procuring 45 anatomical subjects—\$1,367.46."

Students in increasing numbers elected work in practical anatomy, which, of course, they would not have done if there had been a scarcity of anatomical subjects. As a result increased space for dissection had to be provided. The anatomical law of 1875 provided relief from the difficulties of the past and assured a solution of the problem for the future. Even then the Regents, in appointing a professor of practical anatomy (1875), required that he "shall give his attention to the procuring of anatomical material." Two years later the demonstrator of anatomy was "charged with the duty of procuring the supplies of material needed for the use of the students." During the succeeding years action had to be taken frequently because of attempts to evade the law by those whose duty it was to send unclaimed bodies to the Anatomical Laboratory.

Dr. Moses Gunn, in July, 1852, was made Professor of Surgery and Lecturer on Anatomy. At the same time Dr. Alonzo B. Palmer was named Professor

of Anatomy. He never served in that capacity; in 1854, after the dismissal of Dr. Jonathan A. Allen, he was given the chair of materia medica and diseases of women and children.

In 1854 Dr. Gunn relinquished his work in anatomy, but served as Professor of Surgery until he resigned in 1867 to accept a position at Rush Medical College in Chicago. When Gunn had been a student at Geneva Medical College Dr. Corydon L. Ford was the demonstrator of anatomy. The two became intimate friends, and in discussing their futures the young Gunn dreamed of the time when they would be associated in a medical college, he as professor of surgery and Ford as professor of anatomy. The dream came true in 1854, when Dr. Ford was offered and accepted the professorship of anatomy at the University of Michigan. At the same time Dr. Edmund C. Andrews was made Professor of Comparative Anatomy.

In 1860 after the death of Dr. Samuel Denton, Professor of Theory and Practice of Medicine and Pathology, which necessitated a change in the duties of the professors, Ford became Professor of Anatomy and Physiology. This title he held until his death in 1894, which occurred two days after he had completed his fortieth course of lectures on the campus and just when he was about to retire as Professor Emeritus. He had tendered his resignation in 1892, but at the request of the Regents he had withdrawn it. Dr. Ford's whole life was devoted to the teaching of anatomy in various medical colleges. As long as the University medical course was only of six months' duration, he was able to teach in other medical schools during the spring and summer.

Dr. James Playfair McMurrich occupied the chair of anatomy from 1894 to 1907, when he was succeeded by Dr. George L. Streeter, who served as Pro-

fessor of Anatomy from 1907 to 1914. After the resignation of Dr. Streeter, the chairs of anatomy and histology were combined under the direction of Dr. G. Carl Huber, who, however, retained his active interest in histology, while Dr. Rollo E. McCotter conducted the anatomical work, as Professor of Anatomy. In 1935, Dr. Bradley M. Patten (Ph.D. Harvard '14) succeeded to the position previously held by Dr. Huber. With the discarding of the title of Director, in 1938, he became Professor of Anatomy and Chairman of the Department of Anatomy.

PHYSIOLOGY AND HISTOLOGY.—Dr. Jonathan Adams Allen, one of the original faculty of five members in the Medical Department, was appointed, in January, 1850, Professor of Pathology and Physiology. But actually he served as Professor of Therapeutics, Materia Medica, and Physiology. After he left in 1854 the medical faculty was reorganized, and Dr. Abram Sager, in addition to his duties in botany and zoology, occupied the chair of obstetrics and physiology.

Upon the death of Dr. Denton, Dr. Ford succeeded to the chair of anatomy and physiology. At that time physiology was purely a didactic subject, and the experimental method was hardly available. The natural approach to physiology was through the microscopical study of the tissues. Hence it was that in April, 1869, Professor Ford was given the additional title of Instructor in Microscopy, and the students taking the course were required to pay an additional fee of ten dollars.

In June, 1872, at the earnest request of Dr. Ford, and in order to secure a more extended course of instruction in physiology, the Regents, at the request of the medical faculty, transferred this subject to Dr. Henry S. Cheever, who, from 1872 to 1876 was Professor of Ther-

apeutics, Materia Medica, and Physiology.

From 1873 to 1875, when Dr. Cheever was on leave of absence in Colorado, Dr. Frederic H. Gerrish was first Lecturer on Therapeutics, Materia Medica, and Physiology, and then, in 1874, Professor. He resigned his chair in 1875.

Cheever resumed his duties in 1875, but was compelled by illness to resign his position in March, 1876. Dr. Burt G. Wilder, of Cornell University, was appointed Lecturer on Physiology for the session of 1876-77.

During this year both Dr. Ford and Dean Alonzo B. Palmer pressed the need of a physiological laboratory and of a permanent professor for that subject. The Regents appealed to the legislature, which responded by an appropriation of \$2,500 for 1877, and one of \$1,000 for 1878.

In June, 1877, Dr. Charles H. Stowell was appointed Instructor in the Physiological Laboratory and was authorized to go to New York and examine instruments and other appliances needed. He visited Bausch and Lomb, and also Spencer at Geneva and examined their microscopes and lenses. As a result fifteen microscopes and a number of minor items were purchased at a cost of about \$1,300.

In June, 1878, Dr. Ford presented a report to the Board of Regents describing the work done during the year in the Physiological Laboratory. With fifteen microscopes it was possible to give a course to six classes, each class consisting of fifteen students. A class devoted one afternoon every week for ten weeks to practical work with the microscope. It thus appears that ninety students received instruction during each ten-week period. Three courses were given, and more than 250 students received instruction during the year. Such was the beginning of actual class instruction in

microscopical work in the Medical Department.

In 1880 Stowell was made Assistant Professor of Physiology and Histology. In the second semester of 1880-81, Dr. Henry Sewall began his service in physiology in the Medical School. Since Dr. Stowell was not in the new department, his title was changed to Assistant Professor of Histology and Microscopy (1881-83). Shortly thereafter, the Regents changed the name of the Physiological Laboratory to the "Histological Laboratory." In 1883 Stowell was made Professor of Histology and Microscopy, which position he held until he left the University in 1889.

The microscope had been introduced into the University as early as October, 1854, for in an addendum to the *Annual Report* of President Tappan, it is stated that "several fine microscopes are also in the use of the [Medical] Department." Nothing is known of these instruments, and it may be assumed that they were not of an expensive type.

In March, 1856, Professors Sager and Winchell were made a committee to contract for the construction of a suitable microscope for the University. The committee spent \$300, and in December a further sum of \$150 was voted to cover the balance due. In September, 1857, the committee received an additional grant of \$19 for accessories. The total cost of the instrument was \$469. Since this amount was charged to the account of "Natural History" it follows that this was the first microscope in the Literary Department. Undoubtedly, it was the transfer of this microscope from the Department of Botany to the Physiological Laboratory that the Regents authorized in October, 1877, with the provision that the Laboratory should furnish a suitable one in return. At all events, the report of the committee on microscopes in 1882 lists a W. and J. Grunow microscope,

purchased in 1856 at a cost of \$500, as being in the custody of Dr. Stowell of the Histological Laboratory. This would seem to explain the statement in Hinsdale's *History of the University* that the first course in histology was given in 1856.

The next record of the purchase of a microscope was in March, 1860, when the medical faculty was authorized to buy a "superior" microscope and certain anatomical preparations offered for sale by Dr. DeVille for \$275. The actual amount was \$228 as shown by the warrant paid on April 3. This instrument, also in the custody of Dr. Stowell, was listed as a Powell and Leland microscope of English make, and purchased "20 or 25 years ago" at a cost of \$150.

A third instrument, listed about 1861 by the committee, as a J. Grunow inverted microscope, was probably acquired by the Chemical Laboratory, and thus came into the custody of Dr. Victor C. Vaughan. Of the remaining sixteen microscopes bought before 1877, two were acquired in 1872, twelve in 1875, and two in 1876. These were used in microscopical botany.

From January, 1877, to June, 1882, the University acquired eighty-five microscopes. The "Report on the Use of Microscopes in the University" (*R.P.*, 1888, pp. 201-10) lists 104 microscopes, twenty-three of which were in the custody of Dr. Stowell (histology); forty-two in the care of Dr. Vaughan (physiological chemistry), making sixty-five (62 per cent) in the Medical Department. Of the remaining thirty-nine microscopes, which were in the Literary Department, thirty-three were used in botany, four in zoology, and two in geology.

In July, 1889, following the resignation of Dr. Stowell, the medical committee of the Board of Regents recommended that the chairs of pathology and histology be combined under Dr.

Heneage Gibbes and that Dr. G. C. Huber be appointed Instructor in Histology. This recommendation was adopted, but two weeks later, the title of Dr. Gibbes was changed back to Professor of Pathology, and that of Dr. W. H. Howell, the newly appointed Lecturer in Physiology, was changed to include histology. The following year he became Professor of Physiology and Histology and held that title until he resigned.

Dr. Howell's successor was Dr. Warren P. Lombard, who was appointed in June, 1892, Professor of Physiology and Histology. To Dr. Lombard the connection of histology with physiology was purely formal, and in 1898 his title was changed to Professor of Physiology.

As mentioned above, Dr. G. C. Huber was made Instructor in Histology in 1889. After graduating from the Medical Department in 1887 he served two years as Assistant Demonstrator of Anatomy. His entrance into the field of histology, in 1889, marked the beginning of a long and successful career. In 1898 he became Junior Professor of Anatomy and Director of the Histological Laboratory, which position he held until 1903, when he was made Professor of Histology and Director of the Histological Laboratory. When anatomy and histology were combined in 1914, Dr. Huber became Professor of Anatomy and Director of the Anatomical Laboratories. He continued, however, to give the work in histology and embryology until his death in 1934, thus completing forty-five years of service in that field. From 1928 to 1934 he served as Dean of the Graduate School.

Dr. Bradley M. Patten became Professor of Anatomy and Director of the Anatomical Laboratories in 1935. He took direct charge of the work in histology, and in this he has been ably assisted by Dr. Elizabeth C. Crosby.

Work in histology began in 1877 in what was known at that time as the

Physiological Laboratory. The space which it then occupied in the old Medical Building continued to be used for that purpose until 1903, when new quarters were provided in the West-Medical Building. In 1926 anatomy and histology were moved into the new East Medical Building.

PHYSIOLOGICAL LABORATORY.—The designation Physiological Laboratory was in use as early as 1877, but the work was in histology and microscopy. By the spring of 1881 the medical faculty recognized the need of a chair in modern experimental physiology. Three names were submitted in answer to letters sent by Dr. Vaughan. H. Newell Martin, professor of biology at the newly established Johns Hopkins University, recommended his assistant, Dr. Henry Sewall. When the vote of the faculty was taken Dr. Sewall received a majority, and his name was sent to the Board of Regents. His first appointment was that of Lecturer on Physiology for the second semester of 1881-82. His ability, enthusiasm, and training were promptly recognized, and in June, 1882, at the age of twenty-seven, he was made Professor of Physiology.

The advent of Dr. Sewall marked a new era in the history of the Medical Department. The purely didactic method gave way to demonstrations and to the experimental approach. His meager laboratory, under the slanting side of the upper amphitheater, became the scene of active research. A number of scientific papers resulted, the most striking of which appeared in 1887 under the title "Experiments on the Preventive Inoculation of Rattlesnake Venom." This work was the precursor of all subsequent studies on immunity to snake venoms and to bacterial toxins. When Dr. A. Calmette, the eminent authority on venom immunity, visited Ann Arbor in 1908, he asked particularly to see the

room in which Sewall had done this pioneer work.

Between Dr. Sewall and Dr. Vaughan, both young men, an intimate friendship developed which undoubtedly widened their horizons. Dr. Sewall's year abroad in 1879-80 familiarized him to some extent with the pioneer work of Pasteur and Koch, and when he returned to Johns Hopkins he already knew of the work being done by Dr. Sternberg, who was working as a guest in Dr. Martin's laboratory. As part of their Sunday afternoon stroll, Sewall and Vaughan were wont to sit on a hill overlooking the Huron River and discuss the "germ theory." The enthusiasm of Dr. Sewall found an eager listener in Dr. Vaughan, who in this way became convinced of the important relation of bacteria to disease. The immediate result of these discussions is probably reflected in the note in *The Chronicle* of January 31, 1885, to the effect that "Dr. Vaughan is giving to the Seniors some interesting talks on Bacteria," and again, on March 14, 1885, in the remark that Dr. Sewall gives the freshmen weekly talks on the "Bacteria Theory."

In spite of an active and vigorous constitution, Dr. Sewall developed in the spring of 1886 the first signs of illness. He spent the summer of that year in Denver and returned in October much improved in health. In November of that year he began his famous "Experiments on Preventive Inoculation of Rattlesnake Venom." The work was interrupted by another attack of illness, and Dr. Sewall was obliged to seek relief in the mountains of North Carolina. On his return, in April, he completed the investigation which marked the beginning of immunology as regards soluble toxins. During the summer of 1887 anatomy was transferred to a new building, and Sewall moved his laboratory into the renovated old dissecting room. In the

spring of 1888 Dr. Sewall asked for a year's leave of absence, and during his absence, in 1888-89, the work in physiology was given by Dr. Joseph W. Warren.

Dr. Sewall returned in April, 1889, and, although not greatly improved in health, he planned to give a course in practical physiology. At the same time he taught the second laboratory course in bacteriology offered in the University. It was there that he examined his own sputum and found the tubercle bacillus present. This was decisive for him, and, in June, he regretfully resigned his position.

Dr. Sewall's successor was Dr. W. H. Howell. He was appointed, in 1889, Lecturer on Physiology and Histology. He was Professor from 1890 to 1892, when he resigned to accept a position at Harvard. Dr. Warren P. Lombard succeeded Dr. Howell, first as Lecturer (1892) and a year later as Professor of Physiology and Histology. Largely at his request histology was dropped from his title in 1898, and he then became Professor of Physiology and held this appointment until his retirement in 1923.

Dr. Robert Gesell, the present incumbent of the chair of physiology, was appointed in 1923. He and his associates have carried on valuable researches on respiration and allied subjects.

As already stated, the modern Physiological Laboratory had its beginning under Dr. Sewall. He saw it develop from poor, makeshift rooms to commodious quarters in the old Medical Building. The laboratory was wiped out in the fire of 1907 which destroyed the western end (built in 1867) of the old Medical Building. Work, however, was carried on in the east half of the building until 1909, and thereafter transferred to the old Chemical Laboratory. Under Dr. Gesell the Physiological Laboratory acquired, in 1925, thoroughly modern quarters in

the south wing of East Medical Building.

PATHOLOGY.—As stated before, one of the six professorships provided for in the Act of 1837 was that of physiology and pathology. Accordingly, in January, 1850, Dr. Jonathan Adams Allen was appointed Professor of Pathology and Physiology, but with the reservation that pathology was to be given by Dr. Samuel Denton, Professor of the Practice of Physic. Hence, Dr. Denton was in charge of pathology from 1850 until his death in 1860. The title of his chair was apparently changed after 1851, for in President Tappan's report for 1853-54 Denton is designated "Professor of the Theory and Practice of Medicine and of Pathology." No record of this change is noted in the *Regents' Proceedings*. Upon the death of Dr. Denton in September, 1860, Dr. Alonzo B. Palmer was appointed Professor of the Theory and Practice of Medicine, Pathology, and Materia Medica. A year later, with the appointment of Dr. Samuel G. Armor, this title was amended by leaving off "Materia Medica."

In 1863 the surgeon general of the United States Army determined to require at least one course of lectures on hygiene and military surgery from candidates for the Army medical staff. The Regents thereupon provided for a course of lectures on hygiene to be offered in the Literary Department. Dr. Palmer was appointed Lecturer for that purpose. In June, 1864, Palmer was appointed "Professor of Pathology, Practice of Medicine and Hygiene," with the stipulation that the course in hygiene was to be given in the Literary and Law departments. This course was discontinued in April, 1869, and at the same time Palmer was appointed Instructor in Auscultation. Incidentally, it may be added that a course in hygiene was not given again in the University until 1887, when Vaughan was appointed Professor

of Hygiene and Director of the Hygienic Laboratory.

The title of Dr. Palmer's chair from 1869 to 1880 was that of Professor of Pathology and Practice of Medicine. As a result of the growth of the Hospital, in 1880, "and Clinical Medicine" was added to this title, which he held until his death in 1887.

The lack of a large hospital made it difficult to secure material for gross pathology. The anatomical law of 1875 relieved the situation to some extent by supplying unclaimed bodies from state institutions. Some of these could be used for pathological demonstrations, and undoubtedly it was with this object in view that Dr. William J. Herdman was made Lecturer of Pathological Anatomy and Demonstrator of Anatomy in 1879. He held the title of Professor of Practical and Pathological Anatomy and Demonstrator of Anatomy from 1882 to 1888.

Dr. Herdman performed occasional autopsies and gave demonstrations of pathological material in the large amphitheater before hundreds of students. The medical faculty, in October, 1887, recognizing the lack of laboratory work in pathology, asked the Board to establish a chair of pathology and to appoint Dr. Heneage Gibbes, of Westminster College, London, England, as Professor of Pathology. This was done by the Board, and modern pathology thus began in the University.

The service of Dr. Gibbes as Professor of Pathology began in January, 1888. He established a laboratory in the basement of the new Anatomy Building, but the quarters were inadequate for the laboratory instruction of students. After the transfer of the Homeopathic Hospital to its new building Dr. Gibbes, in 1892, acquired ample space for his work.

Dr. Gibbes, unfortunately, had an ar-

bitrary and intolerant disposition which brought on clashes with his colleagues. The appointment of a nonmedical man, Dr. James P. McMurrich, as Professor of Anatomy gave him an ally in the person of Dr. W. A. Campbell, Assistant Professor of Anatomy, who aspired to the chair. Together they formulated and presented to the Regents a sweeping plan for reorganizing the Medical Department. A somewhat similar plan was presented by Dean Obetz, of the Homeopathic Department. As a result, the chair of pathology was abolished, as of October 1, 1895, and the title of Dr. George Dock was amended to Professor of Theory and Practice of Medicine and Clinical Medicine and Pathology.

Dr. Aldred S. Warthin was made Assistant to the Professor of Theory and Practice of Medicine in 1891. In June, 1892, he became Demonstrator of Clinical Medicine and held this position until 1895, when he became Instructor in Pathology. In 1899 he became Assistant Professor. In 1902 he was made Professor of Pathology and in 1903 Director of the Pathological Laboratory.

Under Dr. Warthin the Department of Pathology was developed into the foremost of its kind. With the completion of the West Medical Building, in 1903, the laboratory acquired new quarters which it still occupies. Dr. Warthin died in 1931 and was succeeded by Dr. Carl V. Weller, who was Director of the Pathological Laboratories from 1931 to 1938, when he was named Chairman of the Department of Pathology.

MATERIA MEDICA AND THERAPEUTICS.

—The sixth and last of the professorships prescribed for the Medical Department, as indicated under the "Original Faculty," was that of *materia medica*, pharmacy, and medical jurisprudence. Therapeutics was not mentioned in the legislative act and hence the term does not appear until after 1851.

Dr. Douglass was appointed, in January, 1848, Professor of *Materia Medica* and was also to discharge the duties of Professor of Pharmacy and Medical Jurisprudence, but, as specified in 1850, he would teach only pharmacy and toxicology. In other words he was given the title required by law, but was not to teach *materia medica*.

The Board in 1850 appointed Jonathan Adams Allen Professor of Pathology and Physiology. It was specified that besides physiology he should also perform in part the duties of the Professor of *Materia Medica*. The teaching of pathology was assigned to the chair of physics.

At the time of his dismissal in 1854, Dr. Allen though nominally Professor of Physiology and Pathology, was still "acting as Professor of Therapeutics, *Materia Medica*, and Physiology." In the reorganization that followed Dr. Alonzo B. Palmer was given the chair of *materia medica* and the diseases of women and children. At the same time Dr. Abram Sager was transferred to the chair of obstetrics and physiology.

After the death of Dr. Samuel Denton in 1860, another rearrangement of duties took place. The work in *materia medica* and therapeutics was divided. Dr. Palmer was appointed Professor of the Theory and Practice of Medicine, of Pathology, and of *Materia Medica*. At the same time Dr. Gunn was made Professor of Surgery and Therapeutics; Dr. Sager, Professor of Obstetrics and Diseases of Women and Children; and Dr. Ford, Professor of Anatomy and Physiology.

In 1861 the Regents amended the titles of Dr. Palmer and Dr. Gunn by dropping *materia medica* and therapeutics, respectively. At the same time a chair of the principles of medicine and *materia medica* was established to which Dr. Samuel G. Armor was appointed.

At the next meeting of the Regents, at the request of Dr. Armor, the title was changed to "Institutes of Medicine and *Materia Medica*." Dr. Zina Pitcher, in 1851, had been named "Emeritus Professor of the Institutes of Medicine and Obstetrics."

Dr. Armor resigned in 1868, having served for seven years. He was succeeded by Dr. H. S. Cheever, after Dr. Robert C. Kedzie had declined the position. Dr. Cheever, made Lecturer on Therapeutics and *Materia Medica* in 1868, became professor of these subjects in 1870. In 1872 physiology was added to the title, thus making it essentially the same as the acting title held by Dr. Allen from 1850 to 1854. Cheever held this position until 1876, interrupted by leave of absence for two years because of ill-health (1873-74). He resumed his teaching in 1875 and resigned in 1876. During his absence the work was carried on by Dr. Frederic H. Gerrish, first as Lecturer and then as Professor of Therapeutics, *Materia Medica*, and Physiology. Dr. Gerrish resigned in 1875.

After the resignation of Dr. Cheever the duties, in part, were passed on to Dr. George E. Frothingham, who was designated Professor of *Materia Medica* and Ophthalmology (1876). In 1880 "and Clinical Ophthalmology" was added to this title.

Dr. Frothingham came to Ann Arbor in 1867, as Prosector of Surgery and Assistant Demonstrator of Anatomy, with Dr. William Greene, his former preceptor, who had been appointed to the chair of surgery. From 1872 to 1875 he was Professor of Ophthalmology and Aural Surgery, and Demonstrator of Anatomy; and in 1875-76 he bore the title of Professor of Practical Anatomy and Ophthalmic and Aural Surgery. In 1876 Anatomy was replaced by *Materia Medica* in this title, which, with the addition of "and Clinical Ophthalmology" in 1880,

he held until his resignation in 1889.

Although *materia medica* was included in Dr. Frothingham's title from 1876 to 1889, it does not follow that he taught the subject for thirteen years. As a matter of fact, Dr. Victor C. Vaughan, in 1883, was appointed Professor of Physiological and Pathological Chemistry and Associate Professor of Therapeutics and *Materia Medica*. He taught the latter subject to pharmacy students and perhaps to medical students. His connection with *materia medica* and therapeutics ended in 1887, when he was appointed Professor of Hygiene and Physiological Chemistry and Director of the Hygienic Laboratory. In the fall of 1887, Dr. Conrad Georg was appointed Instructor in *Materia Medica*. This title he held for two years and in 1889, when Dr. Frothingham resigned as Professor of *Materia Medica* and Ophthalmology, Dr. Georg was appointed Instructor in *Materia Medica* and Therapeutics, which position he held for one year.

During the forty years that had elapsed since the opening of the Medical Department, the teaching of *materia medica* and therapeutics had been purely didactic and often had been combined with some other discipline. Like a poor relative it was passed around from one professor to another. Thus, during four decades the names of ten men, from Douglas to Georg, were associated with *materia medica* and therapeutics. By contrast, during the fifty years that followed, these subjects were presented by only three men.

PHARMACOLOGY.—In 1890 the Regents established a chair of *materia medica* and therapeutics, and Dr. John J. Abel was appointed Lecturer on these subjects, to begin his duties on January 1, 1891. In June, 1891, he was made full Professor, which post he held for the next two years, when he resigned to accept the chair of pharmacology in the new

Medical School of Johns Hopkins University.

Just as the appointment of Dr. Sewall marked the beginning of a new era in physiology, so the appointment of Dr. Abel was equally significant for pharmacology. Although he did not have the title he was, in fact, the first professor of pharmacology at Michigan. He introduced the experimental, scientific approach to the subject of *materia medica* and therapeutics. Like Dr. Sewall he had to begin his research work in a small room under the sloping sides of the lower amphitheater in the old Medical Building. The facilities were meager, but the enthusiasm for research was uppermost.

Dr. Abel was a stimulating, prolific, and tireless investigator. He was succeeded in 1893 by Dr. Arthur R. Cushny, who resigned in 1905. Under Dr. Cushny the laboratory space was enlarged by taking over a large room in the old Medical Building. It was well equipped, and it became possible to give the practical course in pharmacology to medical students. The first course, given in 1894-95, was optional for a limited number of junior medical students. In 1909 after removal of the department to the old Chemistry Building, it became possible to make the laboratory course in pharmacology a required one for all medical students.

After Dr. Cushny's resignation, Dr. C. W. Edmunds, who had been his assistant, was given charge of the Pharmacology Department, as it was commonly designated. In 1907 he became Professor of *Materia Medica* and Therapeutics and Director of the Pharmacological Laboratories. Under the supervision of Dr. Edmunds the laboratory, through its research work, became recognized as the foremost of its kind. Dr. M. H. Seevers succeeded Dr. Edmunds in 1941 as Professor of *Materia Medica* and Therapeutics.

ELECTROTHERAPEUTICS.—In 1875, the Board appointed Dr. John W. Langley of Pittsburgh, Pennsylvania, as Acting Professor of General Chemistry and Physics, and a year later he was made full professor. Early in 1880 Langley offered an elective course in electrotherapeutics to the medical students, which consisted of practical laboratory work in its applications to medicine. The faculty report in 1882 recorded that the assistant in charge gave seventy-two lessons in electrotherapeutics to sections of the class and a quiz once a week during the first semester.

Incidentally, charges were preferred against this same assistant for unethical advertisement of an "electrical belt" through local dealers. The Board brought in a Scotch verdict, whereupon Dr. Frothingham and Dr. D. Maclean tendered their resignations. A month later, the Board reversed itself, and the resignation of the assistant was requested and at the same time the resignations of the professors were tabled.

In 1888 Dr. W. J. Herdman gave up his connection with pathology and was named Professor of Practical Anatomy and of Diseases of the Nervous System. In 1890 he was made Professor of Nervous Diseases and Electrotherapeutics. A practical course in the latter subject was organized and required of all medical students. It was given in the old Chemical Laboratory, but after the death of Dr. Herdman it was discontinued. In 1898 Herdman was given the title of Professor of Diseases of the Mind and Nervous System and of Electrotherapeutics.

HOSPITAL LABORATORIES.—The old Hospital on the campus provided few or no facilities for diagnostic purposes, although the rules of 1891, providing for the government of the hospitals, required the resident physician to "see

that all analyses and examinations of sputum, urine, etc., as required by the clinical Professors are made and properly reported to them."

When the Catherine Street Hospital was occupied in 1892, there was no provision for laboratories, and Dr. George Dock was obliged to convert a water closet into a diagnostic laboratory. Under most unfavorable conditions he organized and equipped a suitable laboratory which soon demonstrated its usefulness. The other clinical departments followed the example set by Dr. Dock.

With the erection of the new Hospital in 1925, provision was made for a central laboratory. Dr. Kenneth Fowler was in charge of it. After his resignation in 1928, Dr. Reuben L. Kahn was placed in charge and given the rank of Assistant Professor of Bacteriology. In addition to the diagnostic work in chemistry, hematology, bacteriology, and serology, some instruction was given in special methods.

The full impact of the laboratory type of instruction was soon felt by the clinical branches. In May, 1892, the Board authorized the establishment of six new courses for junior students, and the appointment of demonstrators to do the work. These courses in the clinical departments were known as demonstration courses and were required of all junior students. Later, they came to be known as junior sections. They are given in medicine, obstetrics, surgery, ophthalmology, otolaryngology, and roentgenology. Incidentally, the first work in roentgenology was done by Dr. Herdman in 1896, shortly after Roentgen's discovery, but it was not until Dr. James G. Van Zwaluwenberg became a member of the staff in 1907 that the program in roentgenology was really inaugurated.

FREDERICK G. NOVY

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THE DEPARTMENT OF ANATOMY

PROVISION for the teaching of anatomy was made with the organization of the Department of Medicine and Surgery in 1849 and the completion of the old Medical Building in 1850. One of the five professorships forming the faculty of medicine was the professorship of anatomy.

There have been five directors of the Department of Anatomy whose personalities are so closely interwoven with the achievements of the department during the period of their incumbency that it appears advisable to divide the ninety years of its development into five divisions. Dr. Moses Gunn directed the department from 1850 to 1854; Dr. Corydon L. Ford, 1854-94; Dr. James P. McMurrich, 1894-1907; Dr. George L. Streeter, 1907-14; and Dr. G. Carl Huber, 1914-34. Since that time Dr. Bradley M. Patten has been chairman.

Moses Gunn (M.D. Geneva Medical College [N. Y.] '46, A.M. *ibid.* '56, LL.D. Chicago '67) was the first Professor of Anatomy, and he held the chair, combined with that of surgery, for four years; he was appointed Professor in 1849 at \$1,000 a year. A statement by Dean Vaughan brings out the personality of the man whose influence was outstanding:

While a student in a medical school at Geneva, New York, he read about the organization of the University of Michigan and the provision that a medical department would, sooner or later, be attached to this institution. Immediately on receiving his medical diploma he started to Ann Arbor, carrying in his grip several dissecting cases and, among his grosser impedimenta, a box of suspicious size and shape and unmarked content.

On arriving in Ann Arbor one cold February in the late forties, he hung out a shingle offering his surgical skill to the public and more discreetly he let it be known to the University students that, in his back office, after a certain hour, he was prepared to initiate any of them who might have the profession of medicine in view into the mysteries of the structure of the human body. He was soon recognized as a most desirable addition to the small group of intellectuals then constituting the faculty and student body of the University. There is no record of his surgical success as a private practitioner but his class in Anatomy was soon in a flourishing condition. His best students in his back office were Robert Kedzie, . . . and Edmund Andrews . . . (Vaughan, pp. 187-88.)

The lectures in anatomy were given by Dr. Gunn four times a week in the morning and were attended by the two classes throughout the college year of six months.

As nearly as can be determined, the first lecture-room was on the third floor of the old Medical Building.

The first anatomical laboratory was no doubt in the northeast corner of the second floor of the same building. Dean Huber has written: "The Anatomical Laboratory is by far the oldest laboratory in the medical department . . . The room then used as an anatomical laboratory is the one now used by Professor McMurrich as a private laboratory" (Huber, "Medical Laboratories," pp. 259-60). This laboratory is estimated to contain about six hundred feet of floor space—or sufficient space for thirty-two students as they work now.

The staff during the formative years consisted of the professor of anatomy, who devoted part of his time to teaching surgery, and a demonstrator of anatomy. The most important duty of the demonstrator of anatomy was to obtain material for teaching practical anatomy in the laboratory. This was a most difficult task, with the two conflicting state laws; for if he obeyed one, there would be no Department of Anatomy.

Dr. Robert Clark Kedzie (Oberlin '47, Michigan '51m, LL.D. *ibid.* '00) was the first Demonstrator of Anatomy and one of the six graduates of the medical class of 1851. He took charge of the first anatomical laboratory while a senior. Dr. Kedzie became a distinguished professor of chemistry at Michigan State College. He has reminded us of some of the difficulties that beset the Medical School at its inception, with reference to the teaching of practical anatomy:

Many persons regarded with awe the dissecting room "where dead folks were cut up," and the question "Where do you get your subjects," had a strange fascination for many people. The reply, "We raise 'em," did not seem to satisfy the inquiring mind. There was no legalized method by which material for

dissection could be secured, and the dark suspicion that graves were robbed in the vicinity took possession of many minds. The suspicion was confirmed when it was discovered that a grave a few miles away had been robbed under atrocious circumstances, fragments of the broken coffin and torn portions of the shroud being left beside the half filled grave. The outrage was charged to the Medical College. Bitter hostility against the College broke forth at once. A mob gathered in the evening with the avowed purpose of burning the medical building; the mob rapidly increased in numbers, and under the harangue of a tap-room demagogue, they announced their purpose of "burning that butcher shop of human flesh, and scattering the young crop of sawbones that would not let the dead sleep in their graves."

The medics had their spies in the mob, and when it was learned that it was planned to burn the medical building, a guard of one hundred armed medics patrolled the campus to protect the building, having signs and countersigns to exclude our enemies. The mob, learning of this determined guard, soon cooled down and dispersed. A suit at law for desecrating a grave, in which the witnesses knew little and remembered less, was the outcome of the excitement. (Kedzie, p. 207.)

Dr. Edmund C. Andrews ('49, '52m, LL.D. '81) was appointed to the position of Demonstrator of Anatomy upon the resignation of Kedzie in 1851 by the following resolution:

Resolved, That Edmund Andrews be and is appointed Demonstrator of Anatomy in the Medical College and that he also discharge the duties lately performed by the Superintendent of Grounds. That for his services under this appointment he be allowed to per cent on all moneys he may collect and account for during the year ending 31st of December next, provided that such percentage shall not exceed \$200. (*R.P.*, 1837-64, p. 494.)

It appears that one of the duties of the superintendent of grounds was to collect the three-dollar anatomy laboratory fee

from each student taking the course (*ibid.*, p. 538). Notwithstanding this dual function of his position and the method of collecting his salary, Andrews held the position until the close of college in April. In later life he became a leading surgeon of Chicago, one of the founders of Northwestern University Medical School, and a recognized authority on the geology of the Great Lakes (Vaughan, *A Doctor's Memories*, p. 188).

The problem of finding adequate teaching material for practical anatomy was insuperable for many years. It is observed that the *Catalogue* of 1853-54 carried the following indefinite statement (p. 36): "Arrangements have been made by which an ample supply of *materiel* for the purposes of practical anatomy has been secured. . . ."

The second period in the development of the department began in 1854 with the change in Gunn's title to Professor of Surgery and the appointment of Dr. Corydon L. Ford (M.D. Geneva Medical College '42, A.M. hon. Middlebury '59, LL.D. Michigan '81) as the second Professor of Anatomy. He held the position for forty years:

Dr. Corydon La Ford . . . [was] a sensitive and earnest teacher, who had a way of "making dry bones and anatomical tissues of absorbing interest." It is said of him that in his day he probably taught more students than any other teacher of anatomy. (Shaw, p. 124.)

Under Ford's direction lectures continued to occupy a large part of the teaching. Laboratory teaching of practical anatomy began to take a very important part in the instruction. He moved the Anatomical Laboratory from the second floor to the attic of the old Medical Building upon his arrival. This was a low room beneath the rafters, occupying the full width of the east portion of the building. The only daylight that reached the interior was through a dome-shaped

skylight. The floor space of this room is estimated to have been about eight hundred square feet.

The *Catalogue* of 1854-55 (p. 36) announced for the first time courses in histology:

. . . . The class is divided into sections for the examination of various tissues of the body by means of the Microscopes, so that each student has repeated opportunities for becoming familiar with the minute structure of parts, and also the practical working of the Instruments.

The teaching of anatomy at the opening of the Department of Medicine and Surgery was supplemented by the use of charts, few of which could be purchased, and by specimens preserved and placed in a room called the anatomy museum. This teaching material was prepared in the laboratory, with additions presented by friends of the school.

Ford continued to collect museum specimens largely for teaching purposes. Many of these specimens are still on exhibit, in cases especially built for them in the corridors on the fourth floor of the East Medical Building, where there is also a catalogue of the specimens in Dr. Ford's handwriting.

In 1860 the Regents decided to combine the teaching of physiology with the chair of anatomy, as follows (*R.P.*, 1837-64, p. 918): "*Resolved*, That Professor Corydon L. Ford be and he is hereby appointed Professor of Anatomy and Physiology, with a salary of \$1,000." And again in 1860, without a change of title, Ford was to have direction of the amount of gas to be used at the "Medical College" (*ibid.*, p. 923).

In 1864, when the medical lecture-rooms were added to the old Medical Building, the Anatomical Laboratory was moved from the attic to the third floor. The new quarters contained an estimated sixteen hundred square feet of floor space. Dr. Lombard has stated that Ford

occupied a small room in the northeast corner of the third floor as his private laboratory.

Ford continued to broaden his teaching so that it included not only practical anatomy in the laboratory but also lectures on anatomy and physiology. There had been created an intense interest in the developing science of histology in lecture and laboratory. The importance of the teaching of histology was recognized by the following resolution of the Regents, in April, 1869: "*Resolved, That Professor C. L. Ford be appointed Curator of the Medical Museum and Instructor in Microscopy*" (*R.P.*, 1864-70, p. 326). It will be observed, therefore, that at the end of the second decade of the development of the School (then the Department of Medicine and Surgery) the Department of Anatomy not only had broadened its teaching functions to include Gross Human Anatomy, lectures and laboratory, but also had developed Microscopical Anatomy and Functional Anatomy (physiology). Ford held these combined chairs as Professor of Anatomy and Physiology, Curator of the Medical Museum, and Instructor in Microscopy.

With the admission of women to all departments of the University in 1870, eighteen entered the Department of Medicine and Surgery in the autumn of that year. Acting President Frieze said of them: "Those who have entered the Medical Department, in accordance with the action of the Board prior to the opening of the year, have formed a class by themselves, both in lectures and in the dissecting rooms" (*P.R.*, 1870-71, p. 5). Just how long this double course of lectures in anatomy continued is difficult to determine. The first anatomical laboratory for women was in the attic of the Medical Building, a room previously occupied by the men. With the completion of the Anatomical Laboratory Building

in 1887 a large room on the first floor was designated as the anatomy laboratory for women, and when West Medical Building was completed early in the present century (1903) such a room was also reserved for women (Huber, "The New Medical Building"). The women and men worked in separate laboratories of anatomy until 1908, when they were assigned to the same laboratory. The latter method has worked out to the mutual advantage of all concerned and is continued at the present time.

In 1872 the teaching of physiology was split off from anatomical instruction and was combined with the chair of therapeutics and materia medica under Professor Henry Sylvester Cheever.

In 1877 the teaching of physiology was combined with that of anatomy, as follows: "The Board request Professor Ford, with the assistance of other Medical Professors, to fill the chair and discharge the duties of Professor of Physiology, aided by the instructor in the Physiological Laboratory to be appointed" (*R.P.*, 1876-81, p. 147).

Adding to the teaching load of the department was the extension of the medical course from six months to nine months in 1877 and the increase of the medical course from two to three years in 1880.

During the year 1877 the Physiology Laboratory was equipped, and the teaching of physiology was again separated from that of anatomy—permanently this time—by the appointment of Henry Sewall (Wesleyan '76, Ph.D. Johns Hopkins '79, M.D. Denver '89, M.D. hon. Michigan '88, Sc.D. hon. *ibid.* '12) as Lecturer of Physiology. As he had already "engaged himself for the year to Johns Hopkins University," this appointment, though made in December, 1881, was not to become effective until October, 1882.

Apparently there has been no decade

in the development of the Medical School when the teaching of the basic medical sciences was undergoing such revolutionary changes. The teaching of physiology developed by Dr. Ford was separated for a time from that of anatomy and then again combined with it, and finally sustained as a separate department.

Histology was recognized as a separate subject in 1877 upon establishment of the Physiological Laboratory, which was also arranged for work in practical histology, and by the appointment of Charles Henry Stowell (Genesee Wesleyan '68, Michigan '72m) as Instructor in the Physiological Laboratory, where the course Microscopical Anatomy was his chief interest. That Dr. Stowell taught this subject well is evidenced by his rapid promotion, as follows:

[June, 1879.] *Resolved*, That Charles H. Stowell, M.D., be and is hereby appointed Lecturer of Physiology and Histology at a salary of \$1200 per annum, from and after the first day of October next.

[Nov., 1880.] *Resolved*, That the title of Charles H. Stowell, M.D., be and hereby is changed from "Lecturer on Physiology and Histology" to "Assistant Professor of Physiology and Histology."

[June, 1883.] *Resolved*, That the title of Dr. Chas. H. Stowell be changed to Professor of Histology and Microscopy. (*R.P.*, 1876-81, pp. 385, 604; 1881-86, p. 361.)

Finally, the name of the Physiological Laboratory was changed to Histological Laboratory, in 1880.

By the creation of the chair of histology and microscopy in 1883, the complete separation of the teaching of microscopical anatomy from that of gross anatomy was recognized. The Department of Histology was maintained as a separate department until 1914, when it was again included in the Department of Anatomy. After having devoted ten important and productive years to instruction in the science of histology, and after

having completed six important pieces of research, Dr. Stowell retired to private life. A copy of his large well-illustrated monograph, *The Microscopic Structure of a Human Tooth*, is in the departmental library. Stowell throughout his life was a loyal alumnus and was deeply interested in the development of the department. Upon the death of his widow, the following bequest was recorded in the minutes of the Board of Regents:

Regent Beal reported to the Board that the widow of the late Dr. Charles H. Stowell, who from 1881 to 1889 was Professor of Histology and Microscopy, at the time of her death, desired that the gold watch which had been presented to her husband at Christmas, 1885 by Dr. Corydon L. Ford, Professor of Anatomy, should go into the possession of the University, and particularly into the custody of the head of the Department of Anatomy and should be passed down from one succeeding holder of that chair to another. The Regents accepted the watch with thanks under these terms and conditions. (*R.P.*, 1936-39, p. 37.)

The Stowell watch has been placed in the custody of Professor Bradley M. Patten, Chairman of the Department of Anatomy.

In the seventies the medical sciences of dentistry and homeopathic medicine were attracting much attention and discussion. Accordingly, two new colleges were added to the University, under the following provisions:

Resolve [d], . . . 4. Students entering the Homeopathic Medical College shall receive instruction in the now existing Medical Department in all branches not provided for by the chairs established above, (including practical anatomy); they shall be entitled to all the privileges accorded students in the Medical Department . . . [The two chairs established were Professor of Materia Medica and Therapeutics, and Professor of Theory and Practice of Medicine.] . . .

Resolved, That a College of Dental Surgery be established, which shall, in addition to the

facilities now afforded by the Medical Department and Chemical Laboratory, be constituted by the founding of two professorships. (*R.P.*, 1870-76, pp. 432, 435.)

It is not surprising then, that, with the added teaching burden of these two groups of students, much of which fell on the Department of Anatomy, the medical faculty was striving to relieve the increasing teaching load. This was attempted in two ways: first, by separating the chairs of physiology and histology from that of anatomy, as stated above; and, second, by increasing the teaching staff of the department. The staff giving instruction in anatomy was increased by an assistant to the professor of anatomy and five demonstrators (*Cal.*, 1877-78).

The great increase in laboratory instruction necessitated a lengthening of the medical course from two to three years in 1880.

The first formal expression by the students of their appreciation of Dr. Ford's great service as a teacher and a friend was the presentation of a large portrait of him in the thirty-third year of his service to the University, officially recorded as follows:

Resolved, That the thanks of the Regents be presented to . . . members of the Junior and Freshman classes of the Department of Medicine and Surgery and to members of the Dental classes for a large portrait of Professor Ford, presented by them. (*R.P.*, 1886-91, p. 113.)

The large portrait of Professor Ford now hangs in the faculty room of the Medical School.

With the increasing popularity of the basic sciences in medicine—particularly anatomy and histology—the available laboratory space became inadequate, and a request for an anatomical building was therefore presented to the Regents in July, 1887 (p. 140):

. . . The Committees on Buildings and

Grounds, and that of [the] Medical Department . . . [recommended] that a two storied building be erected at a cost not exceeding the sum of \$6,000, for the uses of dissecting rooms and a dead room, and that said building be located conveniently to the Medical College, but not within 100 feet of the same.

This building was ready for use in the college year beginning October, 1889. It is said to have been the first building in this country to be used exclusively for instruction in anatomy. The floor space provided for anatomy in the Anatomical Laboratory Building has been estimated to be about 2,400 square feet. The main laboratory was on the second floor, where the men worked; it was lighted by small windows in the side walls and by several skylights built into the slant of the roof. The interior of this room was unique, in that all of the great timbers that supported the roof were plainly visible, giving the appearance of what many of us believe a lodge should be. Near one end of the room from a tall, boxlike stage, about four feet square, the demonstrator might at leisure look down upon the bearded students of that day, assembled six to eight at a table. The first floor furnished a small dissecting room for women and contained the wash-rooms. The Anatomical Building allowed for the expansion of the laboratories of histology, physiology, and, in fact, of all of the basic sciences, and the acquisition of this extra space was a necessary readjustment for the extension of the medical course from three years to four years in 1890. The completion of the new Anatomical Building evidently relieved the crowded condition of the department for only a short time, however, for additions to the structure were authorized in 1893.

The death of Professor Ford in 1894 brought to a close a forty-year period in the development of the Department of Anatomy. Much of his time was devoted

to teaching in the department. The remainder was consumed by his development of investigative methods for creating charts, models, mannikins, and teaching specimens of all kinds. Most of the teaching aids could not be obtained in the markets of the world during Ford's career, and those few that were obtainable were prohibitive in price. As a result of Ford's foresight, the University has thousands of teaching specimens illustrative of normal and pathological anatomy, both human and comparative.

Space will not allow more than merely mentioning the names of many of the men who as demonstrators assisted Ford during the years when he had charge of the Anatomical Laboratory. Some of these—notably, Andrews, Lewit, Cheever, Frothingham, Breakey, Herdman, Campbell, and Huber—have added materially to American medicine, mostly in fields other than anatomy. There are four articles that former students of Dr. Ford frequently mentioned whenever they spoke of that great personality—a multicolored human skull, his chart of the twelve cranial nerves, a cane made from Admiral Perry's flagship, and a light stool with "Ford" carved in the seat—and these are to be found in the departmental library.

Occupying hardly a lesser place than Dr. Ford in the memories of the older medical graduates was his factotum, Gregor Nagele, better known as "Doc" Nagele. As an immigrant just landed, he helped in the construction of the old Medical Building, and remained to become for years the presiding genius of the Department, and, through his long association with Dr. Ford, an unofficial demonstrator of anatomy to the "boys." (Shaw, p. 124.)

James Playfair McMurrich (Toronto '79, Ph.D. Johns Hopkins '85, LL.D. Michigan '12) was appointed the third Professor of Anatomy and Director of the Department of Anatomy in 1894 and

served the University faithfully for thirteen years. When he came to direct the department the anatomical laboratories were in the Anatomical Laboratory Building about two hundred feet south of the present West Medical Building. His private laboratory was in the northeast corner of the second floor of the old Medical Building.

Dr. McMurrich brought to the University very definite ideas as to the function of the Department of Anatomy, which were adequately expressed in his own words:

An anatomical laboratory has a treble purpose to fulfill. A thorough knowledge of the structure of the human body and of its various parts, of the arrangement of these parts and of their physiological and topographical relations is essential to both the physician and the surgeon, and in no way can this knowledge be obtained but by actual, personal investigation. One purpose then, which may be termed the special purpose of an anatomical laboratory is to provide means whereby the student may obtain at first hand, that knowledge of the structure of the human body which will enable him later to pursue the study of medicine and surgery intelligently and successfully. It is a common, but erroneous idea that this is the only *raison d'être* of an anatomical laboratory. In reality, however, the study of anatomy is not a part of the study of medicine, but rather a preliminary to it, and in this connection laboratory work in anatomy has a further purpose, a *general* purpose, namely, to train the student to habits of observation and deduction. Whether for professional or general education this side of a laboratory's usefulness cannot be too greatly emphasized and no laboratory course offers greater opportunities for this kind of training than a practical course in anatomy. Finally the third purpose of an anatomical laboratory is to afford opportunities for increasing our knowledge of the structure of the body. It is another erroneous idea that our knowledge of the human body is complete. On the contrary there is yet very much to be learned, not only as to the actual

details of structure, but also as to the meaning of the anomalies which occur so frequently. This, which may be termed the *higher* purpose of an anatomical laboratory, has been too much neglected in the laboratories of this country, although from the purely scientific standpoint it is by far the most important of all the purposes of an anatomical laboratory. To fulfill these various purposes an anatomical laboratory requires an extensive equipment, a corps of specially trained instructors. In its early days the laboratory of the University of Michigan was necessarily conducted almost entirely for its special purpose, but the aim of those in charge has always been to place it in a position to fulfill *all* the purposes which might be demanded of it. Before this can be accomplished however, many facilities, such as a more ample building, an improved equipment and a larger corps of instructors must be provided. This being accomplished the University of Michigan will have an anatomical laboratory second to none and worthy of the great institution of which it is a part. (Huber, "Medical Laboratories," pp. 261-62.)

When McMurrich took over the direction of the department he introduced a well-organized course in the anatomy of the nervous system. This course consisted of a series of lectures followed by laboratory work. The first Neurological Laboratory was arranged by Dr. McMurrich on the first floor of the Anatomical Laboratory Building. It was impossible to provide human material for laboratory instruction at that time; therefore, a careful study was made of the sheep brain. When the West Medical Building was completed in 1903, not only was provision made for laboratory instruction in gross anatomy, but also, adequate space was provided for the practical study of the central nervous system and special sense organs. This laboratory was situated on the south side of the third floor of the West Medical Building. A very interesting commentary on the introduction of this course is the action of the Board of Regents: "That Dr. McMurrich

be allowed to give a course on the anatomy of the special senses" (*R.P.*, 1896-1901, p. 105).

In teaching the anatomy of the nervous system as a subject separate from that of gross anatomy, Dr. McMurrich laid the foundation for that division of anatomy now known as the Laboratory of Comparative Neurology.

Perhaps the first official recognition that the subject of anatomy is a part of a general education and is not restricted to those interested in the medical sciences was provided when, by the action of the Regents, McMurrich was recognized as a member of the literary faculty (*R.P.*, 1896-1901, p. 104). The first course in anatomy for students of the Graduate School (then a department within the Department of Literature, Science, and the Arts) of the University was also provided for upon the completion of the West Medical Building (*Cal.*, 1903-4).

The Department of Anatomy occupied the east half of the third floor, the southeast portion of the second floor, and the northeast portion of the basement of the new building. The teaching laboratories occupied 4,490 square feet of floor space, besides the space devoted to adequate private laboratories for the staff, and to such additional rooms as the storeroom and morgue. McMurrich's private office was on the third floor, adjacent to the court (Huber, "The New Medical Building," p. 203). In 1907 Dr. McMurrich resigned as Director of the Department of Anatomy, after thirteen years of service, to accept a similar position at his alma mater, the University of Toronto.

George Linus Streeter (Union '95, A.M. Columbia '99, M.D. *ibid.* '99), the fourth Professor of Anatomy and Director of the Department of Anatomy, came to the University in 1907. The teaching staff consisted of the professor, one demonstrator, one instructor, and four assistant demonstrators. Streeter reorganized

the department—the staff as well as the courses of instruction—and for the first time prepared teaching material according to modern methods of preservation.

Up to this time osteology, or the study of the skeleton, was taught largely by lecture. The lectures were supplemented to a very limited extent by the demonstration of five or six skeletons in the department. Streeter immediately recognized that one of the most fundamental systems of the structure and function of the body could not be properly taught without adequate material. In 1909 he was permitted to establish the loan collection of bones (*R.P.*, 1906–10, p. 563). This collection, prepared within the department, grew rapidly under his direction. New sets have been added to it from year to year, until in 1940 the loan collection consisted of 250 complete sets. In addition, there were about two hundred sets nearly ready for use. No doubt this is the largest and most valuable collection of human skeletons for teaching purposes in this country.

In the field of investigation Streeter attracted many young men to his laboratories, where he offered full opportunity for individual investigation unhampered by European traditions. He encouraged optimism and freedom of thought and action; he expected, and obtained, results. His influence as a teacher and investigator broadened the scope of the department more than it had been broadened in any previous period. He directed the preparation of the first group of serial sections of mammalian brains prepared at the University for research purposes. These aids materially increased the interest in the study of the anatomy of the nervous system. Dr. Streeter was not only an excellent teacher and organizer, but also a trained investigator in the fields of neurology and embryology. He soon found conflict in these fields of

investigation incompatible with ideals in research. In 1914 he resigned from the University to go to the Carnegie Institution of Washington, where he became Director of the Department of Embryology and Chairman of the Division of Animal Biology.

Upon the resignation of Dr. Streeter the Regents requested the medical faculty to devise a plan which would not involve an increase in the budget of the department (*R.P.*, 1910–14, p. 960). Anatomy and histology were combined and the title of Gotthelf Carl Huber ('87*m*, Sc.D. hon. Northwestern '30) was changed from Professor of Histology and Director of the Histology Laboratory to Professor of Anatomy and Director of the Anatomical Laboratories. Huber was the fifth Director.

The development of the subject of histology has been traced above, from the time of the appointment of Ford (1854), who gave demonstrations on the minute structure of the human body by the use of the only microscope owned by the University, up to the recognition of a separate Department of Anatomy, with a well-equipped laboratory, by the appointment of Stowell as Professor of Histology and Microscopy (1883). The teaching of microscopic anatomy developed rapidly under Stowell. He gradually acquired the best equipment for the Histology Laboratory for teaching, demonstration, and research purposes. He encouraged original investigation among his associates by his own example. The capacity of the laboratory doubled under his guidance: only fifteen students could be dealt with in each section in 1877, but when he resigned, in 1889, there were facilities for thirty students per section.

After Stowell's resignation the chair of histology had been combined with that of pathology under Heneage Gibbs (M.B. and C.M. Aberdeen '79, M.D. *ibid.* '81);

and Dr. Huber at that time had been designated Instructor in Histology.

Dr. Huber, after having served as Assistant Demonstrator of Anatomy under Ford in 1887 and as Instructor in Histology under Gibbes in 1889, began the direction of histology teaching. In 1890 the chair of histology was separated from that of pathology and was combined with that of physiology under William Henry Howell (Johns Hopkins '81, Ph.D. *ibid.* '84, M.D. hon. Michigan '90, LL.D. *ibid.* '12, Sc.D. Yale '11), Professor of Physiology and Histology. Although histology was nominally combined with physiology, first under Howell and later under Lombard, Huber was privileged to guide its development along the lines of teaching and research.

When the Anatomical Laboratory Building was completed in 1889 the Department of Anatomy vacated the third floor of the old Medical Building and the Physiological Laboratory was moved into these quarters. Histology as well as physiology was taught in this laboratory until 1892, when "the histology laboratory was . . . moved to the second floor of the medical building" (Huber, "Medical Laboratories," p. 4). This laboratory now occupied the north half of the second floor, and Huber's private laboratory was across the hall. The floor space assigned to this department is estimated to have been 1,200 square feet.

In 1903 the Department of Histology was moved from the second floor of the original Medical Building to the second floor of the West Medical Building, where it occupied the northeast portion. The student laboratory was increased to 1,800 square feet of floor space. In addition to this laboratory there were a library, storerooms, and many rooms for members of the staff. Huber's private laboratory was on the north side. In 1898 the Regents made provisions for a separate chair of histology, as follows:

Resolved, That the title of Professor Lombard, now Professor of Physiology and Histology, be changed to Professor of Physiology. That Dr. McMurrich's title be made Professor of Anatomy and Director of the Anatomical Laboratory; and that Dr. Huber's title be made Assistant Professor of Anatomy and Director of the Histology Laboratory. . . . (R.P., 1896-1901, p. 218.)

Dr. Huber, with one assistant—Dr. Lydia Maria Adams De Witt ('99, '98m, A.M. hon. '13), continued the development of the department according to his conception of its functions, namely, the teaching of medical and dental students and of students from other departments, and original investigation.

The Histology Laboratory, as well as the laboratories of the basic sciences, became overcrowded. The completion of the West Medical Building in 1903 allowed the expansion of laboratory facilities so that students from the Graduate School and from certain departments within the Department (later the College) of Literature, Science, and the Arts were permitted to pursue studies in the Department of Histology. Dr. Huber found time, in addition to that required by his heavy teaching load, to continue research to such an extent that by 1914 he had completed sixty publications, either individually or in collaboration with others (Thompson, pp. 33-41).

The story of this era in the development of the Department of Histology would hardly be complete without mention of his only, but capable, assistant, Lydia De Witt. Dr. De Witt, during her thirteen years as assistant in the Department of Histology, by publishing six papers contributed in no small measure to the fulfillment of Huber's ideal of continuing research. After leaving the University, she spent most of the remaining sixteen years of her life with the Sprague Memorial Institute and with the University of Chicago, where she became

a prominent pathologist (Livingston, p. 31).

Many advanced students became interested in the science of histology at this time. Among them were Atwell, Guild, Curtis, Eggerth, and Clark. All have become prominent in one field of medical science or another; two have followed in the footsteps of their illustrious teacher. Wayne J. Atwell (Ph.D. '17) became professor of anatomy and director of the Anatomical Laboratories in the University of Buffalo, and Stacy R. Guild (Ph.D. '18) became director of the Department for Otological Research at Johns Hopkins Hospital.

In 1914 the Department of Anatomy and the Department of Histology were again combined as the Department of Anatomy, and Huber was placed in charge. Under his direction the Department of Anatomy rapidly developed courses that attracted students in departments of the University other than the two medical schools and the School of Dentistry. Soon the portion of the West Medical Building allocated to the Department of Anatomy became so overcrowded that even the addition of a large room in the basement brought only temporary relief. With the completion of the East Medical Building in 1925, however, this condition was relieved, and provision was made to develop courses for physical education, first announced in 1927. Courses in anatomy for nurses were announced the same year, as well as the Anatomy and Physiology of the Vocal Organs, a course for graduate students in the Department of Speech, and in 1932 a course was arranged for students in the Department of Fine Arts. In 1934 a course was arranged for students of the biological sciences. Many students from the Graduate School continued to apply for a place in the neurological division of the department. Graduate students of the School of

Dentistry attended in large numbers the course in the division of gross anatomy arranged for them the second semester. Finally, courses in gross anatomy for interns were so arranged that they could work in the evenings, whereas in the similar courses for graduates in medicine the students worked throughout the day.

Not only was the teaching program for undergraduate and graduate students broadened under Dr. Huber's direction, but also many pieces of valuable equipment for teaching and original research were added. Among these were a well-equipped photographic room, including microphotographic apparatus, X-ray apparatus for teaching and research, and a well-equipped laboratory for making the Born wax-plate reconstructions.

During all of his association with the Department of Anatomy, Huber was particularly interested in neuroanatomical as well as in histological and embryological fields, as is evidenced by his research record. His interest in neuroanatomy reached fruition in the development of a Laboratory of Comparative Neurology, recognized by the Regents of the University as such in 1929 and having as its *raison d'être* a group of workers interested in neurological research and one of the largest collections of comparative neurological material available in this country or abroad. The collection, much of which was prepared by Huber, consisted of approximately six hundred complete series of the brains and spinal cords of various animals. These series, stained by standard methods, are one of the most valuable possessions of the Department of Anatomy.

During the twenty years that G. Carl Huber directed the Anatomical Laboratories he published thirty-two contributions to science. Most of these were in the field of comparative neurology; many were written in collaboration with others, in particular, with Elizabeth C.

Crosby. Besides the publications mentioned above there were many contributions by members of the staff and by graduate students.

In the Laboratory of Comparative Neurology Professor Elizabeth C. Crosby (B.S. Adrian '10, M.S. Chicago '12, Ph.D. *ibid.* '15) has had an outstanding influence. Before coming to the University in 1920, Dr. Crosby worked for several years with Professor Herrick, one of the best-known comparative neurologists. After coming to the University she was associated with Dr. Huber in the development of the laboratory. She has produced many original and important pieces of research, mostly in collaboration with Huber. Upon his death in 1934, she completed revision of that outstanding two-volume treatise, *Comparative Anatomy of the Nervous System of Vertebrates*. She took over the task of completing the "Huber Memorial Volume" of the *Journal of Comparative Neurology*. In 1936-37 Crosby brought to the University, for conferences on neurology, Dr. C. U. Ariens Kappers, Dr. Herrick, and Dr. Larsell—three of the foremost neurologists of the world. She is an exceptionally successful teacher and is loved by all her students. We of the University were late in recognizing that in our midst is one who ranks among the leading neurologists of the world. The University is aware that with Professor Crosby directing the division of neurology in the Department of Anatomy its high standard is assured.

Bradley Merrill Patten (Dartmouth '11, Ph.D. Harvard '14) was appointed the sixth Professor of Anatomy and Director of the Anatomical Laboratories in 1935. It was decided that three divisions be made within the department, and that an adjustment of space be made for teaching and for research—the division of embryology and histology, the Laboratory of Comparative Neurology, and

the division of gross anatomy. The division of embryology and histology is under the direct charge of Professor Patten. The teaching laboratory is on the second floor of the East Medical Building. The laboratory has about 180 microscopes, an excellent loan collection of microscopic slides for histology, and a good loan collection of microscopic slides for embryology. With the seating arrangement providing adequate working light, the microscopical laboratory will accommodate 144 students. Patten's private office is on the second floor, and the research laboratories are in the south part of the first floor. To the photographic laboratory has been added a motion-picture outfit for microscopic work. The general shift in the allotment of space within the department has given to the Laboratory of Comparative Neurology a group of twelve rooms on the fourth floor of the East Medical Building. Within this space have been arranged a large laboratory for technical work, a seminar room, a small but reasonably well-equipped experimental laboratory, a secretary's room together with space for housing the neurological collection, projection and chart rooms, and a series of smaller rooms for neurological research, all of which are occupied. The collection has been arranged and catalogued, and additions to it are constantly being made. A research grant from the Graduate School has made possible the development of a monkey colony having special quarters on the fifth floor. A program in normal and experimental neurological research is being carried on by members of the department and by graduate students.

The division of gross anatomy occupies portions of the first, the third, the fourth, and the fifth floors of the East Medical Building. There is working space for 472 students. The division of gross anatomy attracts students from

many of the schools and colleges of the University. The groups that receive instruction in these laboratories are: from the Medical School, first-, second-, and third-year medical students and graduates in medicine; from the School of Dentistry, both undergraduates and graduate students; and students from the School of Nursing, the School of Education, the Institute of Fine Arts, the Department of Speech, the Graduate School, the College of Architecture and Design, and the Summer Session. During 1936-37, 578 students pursued courses in gross anatomy.

The state anatomical law under which teaching material may be provided for the medical schools was passed in 1867. It has been amended many times since. The Michigan law is the best one ever enacted for scientific purposes, and it has been used as a model for similar legislation in other states.

A careful record of all the bodies sent to the University has been kept, beginning in 1881. By 1940 more than 10,000 subjects had been received. The rate of arrival of bodies is between four hundred and five hundred per year, a sufficient number at this time for the very large enrollment in the department. The subjects are cared for by a full-time embalmer and

morgue director. After the bodies are used for scientific purposes they are cremated in a crematory built for this purpose. The ashes are buried once a year, with the Christian burial service, on the University lot in Fairview Cemetery.

The first morgue was built in the basement of the old Medical Building, at a cost of \$185.81. In 1889 a morgue was built into the basement of the Anatomical Laboratory Building. When the West Medical Building was completed in 1903, a morgue with a capacity of fifty subjects was constructed and was furnished with refrigeration machinery. In the East Medical Building a large morgue, with a capacity of 200 subjects and with refrigeration apparatus, was provided.

It is fitting that the present members of the department should record with pride the achievements of their predecessors. But that alone is not enough. The tradition of scholarly work must continue without interruption, for we are realizing with increasing clearness that teaching soon becomes barren without the revivifying effect of original investigation.

ROLLO E. MCCOTTER*

* Rollo Eugene McCotter (1891), Professor of Anatomy in the University since 1914.

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THE DEPARTMENT OF BACTERIOLOGY AND SEROLOGY AND THE HYGIENIC LABORATORY

THE beginning of bacteriology in the University can be traced back to 1881. In June of that year the Board of Regents established a School of Political Science, and among the courses listed was Sanitary Science, taught by Dr. Victor Clarence Vaughan (Mount Pleasant College [Mo.] '72, Ph.D. Michigan '76, '78m, LL.D. *ibid.* '00), then Assistant Professor of Physiological Chemistry. In the outline of the course, as given in the University *Calendar* for 1881-82, twelve main topics were presented, and among these the fifth is of special interest, since it concerned "Ferments and Germs; physiological ferments, and fermentation; disease germs; filth diseases; antiseptics and disinfectants and their use; quarantine, vaccination, etc." This was an elective course begun in October, 1881, in the Department of Literature, Science, and the Arts and consisted of lectures, twice weekly, in the first semester.

At that period it was quite proper to speak of the "germ theory," for bacteriology was then in its infancy. The bacteria of several human diseases, apart from those of animals, had been seen, but in the absence of suitable means of cultivation it was not possible to prove their role as causative agents. It was early in 1881 that Pasteur and, independently, a few weeks later, Major G. M. Sternberg, of the United States Army, discovered the microbe of sputum septicemia which later came to be identified as the cause of pneumonia. The bacillus of tuberculosis was not discovered until the spring of 1882. Again, it was in 1881 that Pasteur began his experimental work leading to vaccination or the preventive inoculation against anthrax and hydrophobia, thus opening up the field of immunology. At this time Dr. Sternberg, Dr. T. J. Burrill, professor of botany at the University of Illinois, and Dr. H. J. Detmers, of the federal Department of Agriculture, were

almost the only persons in this country who were engaged in the study of bacteria. Thus, it is seen that the significance of sanitary science, and incidentally of bacteria, was recognized at a very early date. Fragmentary though the treatment of the subject of bacteria must have been at this time, before a decade passed, as a result of intensive work with the newly discovered method of plate cultivation, bacteriology became a study of commanding importance.

An account of the early development of bacteriology in the University would be incomplete without the mention of Dr. Henry Sewall, who, from 1882 to 1889, was Professor of Physiology. Though only twenty-seven years of age at the time of his appointment, he had been trained under Martin at the Johns Hopkins University and had also studied abroad. Indirectly, he had acquired some knowledge of the work being done on bacteria, since he had been closely associated with G. M. Sternberg, who had worked as a guest in Martin's laboratory. Hence, he was familiar in a general way with the subject when he arrived in Ann Arbor, where he became an intimate colleague of Vaughan. Together the two young men frequently discussed the germ theory, and there is no doubt but that the convictions of the young biologically trained physiologist carried the day.

Fifty years later, in the closing paragraph of his book, *Society and the Natural Law* (p. 78), Sewall recalled the course in sanitary science and paid a tribute to Vaughan:

[Dr. Vaughan] was a pioneer in a Golden Age, and in virile, emphatic teaching he led his class to see with him the formation of organic compounds in plants, their metabolism in the animal. He told of the ferments and germs and their relations to health and disease. He invented a course in hygiene which

was a forerunner of our noble institutions of Preventive Medicine. The largest lecture room became crowded with students who relished with zest a culture which included the motivation of their own bodies in health and disease, but stressed above all the mastery of man over his environment and his fate.

The course called Sanitary Science was given by Dr. Vaughan to students of the Department of Literature, Science, and the Arts for a decade. In 1884 he also introduced in the Department of Chemistry a practical course, Sanitary Examinations, dealing with the analysis of such materials as water, foods, and drugs. It was later transferred to the Hygienic Laboratory and in 1892 was designated Methods of Hygiene. Since 1890, separate courses in water analysis and food analysis have been given. The medical students were given a separate course of twenty lectures, Sanitary Science, from 1884 to 1891, when it was divided into two courses, Bacteriology and Hygiene. The latter was given by Vaughan until his retirement in 1921.

By 1885 the growing importance of the study of bacteria was recognized, and a special course for medical students, the Study of Bacteria (ten lectures), was listed in the *University Calendar* for 1885-86, and again in the next two years. Unfortunately, nothing definite is known regarding these lectures. From items in the students' publication, *The Chronicle*, it would appear that the lectures were given by Vaughan and Sewall. In the issue of January 31, 1885 (p. 156), Vaughan was reported as "giving the seniors some very interesting talks on Bacteria." And again on March 14 (p. 215), Sewall was said to be giving the freshman medical students weekly talks on the "bacteria theory." His assistant, Dr. Harry Lum, was mentioned (p. 237) as carrying on an original investigation on the bacterial theory. Further, on

March 12, 1887 (p. 70), the statement was made that Dr. Hugo Lupinski was requested to lecture on microorganisms. He certainly possessed at that time a copy of Hueppe's *Methoden*. Dr. Otto Landman ('84, '87m, A.M. hon. '12) was very much interested in the subject and remembered staining for tubercular bacilli and diphtheria bacilli and trachoma.

However scanty these lectures on bacteria may have been, it is noteworthy that in this period a significant contribution was made to the subject of immunity, then in its infancy. As indicated above, Sewall, though primarily a physiologist, was deeply interested in the rapidly developing subject of bacteriology. He was fascinated by Pasteur's studies on vaccination. At the time it was believed that the poisonous properties of bacteria were due to basic products known as ptomaines. Sewall reasoned that immunity might be produced by repeated injections of the soluble products of bacteria, and since he himself was unable to work with these organisms, he looked about for a suitable substitute. The toxicity of the venom of the rattlesnake was known to be caused by soluble poisonous proteins. He gave pigeons repeated injections of small doses of the venom and rendered them refractory against seven to ten times the fatal dose. A short paper describing his experiments was published in the spring of 1887; it antedated by six months the first work on the production of immunity with the soluble products of *Vibrio septique* (Roux) and by three years the immunization of animals with tetanus and diphtheria toxins (Behring and Kitasato). His was the pioneer work in antivenom serum therapy.

The recognition of Vaughan's interest in the teaching of sanitary science led to his appointment in February, 1883, to the Michigan State Board of Health. He was a member of that board continu-

ously, except during the period 1895-1901, until 1919, when the State Board of Health was abolished and the office of State Health Commissioner was created. In January, 1884, at a time when outbreaks of cheese poisoning were claiming attention, he urged upon the Board of Health the need of a fully equipped sanitation laboratory at the University, but no action was taken at that time. The suggestion was made again in October, 1886, and then the Board of Health requested the Board of Regents to consider the advisability of establishing a laboratory of hygiene in which original investigations—chemical, microscopical, and biological—should be carried on, and in which attention should be given to the analysis of water, the adulteration of food, and the practical investigation of other problems of sanitary science. A committee appeared before the Regents on December 7, 1886, and presented in full the needs of such a laboratory. To meet this and other requests the Regents asked the legislature of 1887 for an appropriation of \$75,000 for laboratories of physics, hygiene, pathology, physiology, and histology. By act of the legislature, approved June 24, 1887, \$35,000 was appropriated "for the construction of a building for scientific laboratories and for the equipment of the same." It was obvious that the amount was inadequate to meet the needs of all the laboratories mentioned, and a committee of the Board of Regents on July 8, 1887, recommended the erection of a three-story brick building to accommodate at least two of the laboratories, those of hygiene and physics, at a cost not to exceed \$28,000, which amount, by amendment, was increased to \$30,000. Actually, when the building was completed there remained an unexpended balance of \$176.93 which was used to buy apparatus for the Hygienic Laboratory.

At the same time a committee was

appointed to present a scheme for the establishment of a department of hygiene. The committee, on July 9, 1887, presented a report signed by V. C. Vaughan, A. B. Prescott, and John W. Langley recommending the establishment of a department of hygiene, the combination of the closely related subjects of hygiene and physiological chemistry in one chair, and the appointment of an instructor. The report was adopted, and Vaughan was appointed Professor of Hygiene and Physiological Chemistry and Director of the Hygienic Laboratory. At a meeting of the executive committee held the same day, Frederick George Novy ('86, Sc.D. '90, '91*m*, LL.D. Cincinnati '20) was appointed Instructor in Hygiene and Physiological Chemistry.

In October, 1887, the Regents accepted the architectural plans of Pond and Pond and awarded the contract for the building, which was to be completed on or before July 1, 1888. There were the usual delays in construction, and the building, the east half of the present West Physics Laboratory, was not completed until the late fall of 1888. The Department of Physics was given the basement and first floor, and the Hygienic Laboratory occupied the second floor and the attic. These quarters were soon outgrown. In 1903 the Hygienic Laboratory was moved to the present West Medical Building and in 1926 to its present location in the East Medical Building.

The Hygienic Laboratory at the University of Michigan was the first of its kind in this country; that of the United States Marine Hospital was started in New York in August, 1887, was moved to Washington in 1891, and is now the National Institute of Health; the hygienic laboratory of the University of Pennsylvania was established in 1890; and the Bender Hygienic Laboratory at Albany was founded in 1896.

Immediately after the establishment of the Hygienic Laboratory, work was carried on in rooms in the old Chemical Laboratory (the present Economics-Pharmacology Building) pending the erection of the new Medical Building. Chemical analyses of water and foods were made, but attempts to do bacteriological work were not satisfactory. It was evident that a first hand knowledge of bacteriological techniques could only be obtained by going abroad for a course of instruction in the new science. Accordingly, Vaughan and Novy went for such a course to Koch's laboratory, the Hygienic Institute of the University of Berlin, in the summer of 1888. At the same time they purchased the necessary equipment for the new laboratory. Later they visited the laboratory of Pasteur in Paris.

The first systematic lectures on the subject of bacteriology were given in the fall of 1888 by Vaughan in his course, Sanitary Science. These lectures he gave also in the following two years, when the designation of the course was changed to Hygiene. Vaughan continued to teach this course until his retirement in 1921. From 1891 to 1934, inclusive, the formal lecture course on general bacteriology was given by Novy. The course was required of all medical students, and also of students of dentistry from 1891 to 1901. In 1935 and for the next few years the lecture course was presented by Dr. Malcolm Herman Soule ('21, Sc.D. '24, LL.D. Saint Bonaventure's College '28), but because of a change in the curriculum in 1938-39 it was no longer required of the medical students, though it continued to be given to nonmedical students. Until the time of this change, the course had been taken by about 8,700 students. A full synopsis of the course is to be found in the *Announcement of the Medical School* (1938-39, p. 66).

In 1888 an attempt was made at giv-

ing instruction in bacteriology in the Department of Pathology. Dr. Heneage Gibbes of London, England, appointed Professor of Pathology, began work in January, 1888, and continued in service until 1895. In the basement of the new Anatomical Laboratory Building he fitted out a small space for bacteriological work. In 1885 Dr. Gibbes had been associated with Dr. E. Klein on the British Cholera Commission and had some acquaintance with bacteriological methods, but unfortunately he did not believe in the germ theory. Hence, though he offered a course in practical bacteriology from 1888 to 1890, very few students were attracted. To Gibbes, the pathogenic germs, such as the cholera and tubercle bacilli, were merely adventitious organisms.

In the fall of 1888 the new quarters of the Hygienic Laboratory were equipped for work, and in January, 1889, the first laboratory course in bacteriology was offered in the University. It is listed in the *University Calendar* for 1888-89 (p. 59) as Original Research in the Causation of Disease. Some very short courses in bacteriology had been given in the East as early as 1887. Perhaps the first course given in New York in 1887 was that by Dr. John E. Weeks ('81m, Sc.D. hon. '12). The course at Michigan was the first comprehensive, experimental course to be offered in this country. It was given daily, afternoons, and on Saturday morning, twenty-four hours weekly, for three months. It was an elective open to students of the Literary and Medical departments. The first class consisted of nine students; the second, beginning in April, had fourteen. In 1889-90, three such courses were given to sixty-three students; in 1890-91, to seventy-one students.

The new four-year course in medicine went into effect in 1890-91, and at that time the three-month course in labora-

tory work in bacteriology, given three times each year, became a required subject for the first-year medical students, but remained optional to others. The medical curriculum was revised in 1900-1901 by the introduction of the block system, wherein all the laboratory courses were placed on an eight-week basis. At the same time the laboratory work in bacteriology was transferred to the sophomore year. As a rule, four courses of instruction in the laboratory, each for eight weeks, were given each year. The schedule continued for ten years. The faculty of the College of Dental Surgery took advantage of the shortening of the course, and in 1902-3 made it a required subject for students of dentistry, which it has continued to be ever since.

Vaughan had become Dean of the Department of Medicine and Surgery in 1891. He remained Director of the Hygienic Laboratory until 1909, when he was succeeded by Novy, who had held a full professorship of bacteriology since 1902.

In 1910-11, as a result of changes in the schedule of studies, the laboratory work in bacteriology was returned to the first-year program of the medical students, in which it has remained to the present time. Moreover, the duration of the course for the medical students was restored to three months, lasting from March to June. With this new schedule, the first period of eight weeks was reserved for the dental students, and the second period of about ten weeks was reserved for the students of other schools and colleges.

In 1923-24 the laboratory period for medical students was extended through the entire second semester, and attendance each afternoon and Saturday morning was required. In 1940 the laboratory period for medical students was cut in half—to three afternoons a week for the semester. In the first semester, two eight-

week courses were given to students in dentistry and in other schools.

The growth and development of bacteriology, or, rather, microbiology, during the past fifty years has made it necessary to alter and expand the laboratory work so as to include the study of new pathogenic bacteria, protozoa, viruses, worms, molds, yeasts, and the methods of serology. The work in bacteriology was conducted by Novy from 1889, when the first course was given, until his retirement in 1935, when it was taken over by Soule. During the fifty years from January, 1889, to January, 1939, instruction in this course was given to about 10,400 students.

Within a few years after the instruction in bacteriology began, requests came from students for further work in this subject. Accordingly, in 1896, a formal course named Special Methods in Bacteriology was given, and this in time was designated Advanced Bacteriology. The student, after acquiring some familiarity with glass blowing and the preparation of Pasteur pipets and blood pipets, worked with filters, germicidal tests, the inoculation and bleeding of animals, the preparation of vaccines, immunization procedures, and serum reactions. In 1905, the first classwork on the pathogenic protozoa in this country was introduced. In the forty years since its establishment nearly seven hundred students have availed themselves of this opportunity for advanced work. As a supplement to the advanced work, for more than twenty years a journal club, or seminar, has fostered the interest of the students.

Owing to the frequency of outbreaks of rabies in the state, the Pasteur Insti-

tute was set up as a part of the Hygienic Laboratory in 1903, with Dr. Thomas Benton Cooley ('91, '95m) in charge. He was succeeded in 1905 by Dr. James Gordon Cumming ('03m, D.P.H. Harvard '15), who in turn was followed in 1916 by Dr. Herbert William Emerson (Ph.C. '01, B.S. Pharm. '02, '15m). Emerson held the position for the remainder of the period. Between March 5, 1903, and August 23, 1941, the Institute provided Pasteur treatment to 2,815 persons with no case of paralysis or rabies following treatment. The bulk of its work has consisted in the examination of 7,772 animals for suspected rabies. Of these, 90 per cent were dogs, and the rest were chiefly cats and other domestic animals, with a few wild animals such as skunks and raccoons.

The Hygienic Laboratory, from its beginning, was called upon to render diagnostic aid to physicians and health officers, by examinations of blood, pus, sputum, and water. Scores of such examinations were made annually until the State Board of Health, through legislative action, established, in 1907, a special laboratory for that purpose at Lansing.

In addition to teaching and diagnostic service, the Hygienic Laboratory has had research as a third objective. During more than half a century since its establishment this objective has been paramount in the endeavors of its staff and is being maintained at the highest possible level. As the result of its contributions the laboratory is known far and wide and has more than justified the expectations raised at the time it was founded.

FREDERICK G. NOVY

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THE DEPARTMENT OF BIOLOGICAL CHEMISTRY

THE University of Michigan was one of the first American universities to recognize the importance of physiological chemistry, chemistry as applied to the living organism in health and disease, as a separate branch of chemistry. In 1883 Victor Clarence Vaughan (Mount Pleasant College [Mo.] '72, Ph.D. Michigan '76, '78m, LL.D. *ibid.* '00), at that time Assistant Professor of Physiological Chemistry, was appointed Professor of Physiological and Pathological Chemistry and Associate Professor of Therapeutics and Materia Medica (*R.P.*, 1881-86, p. 360). Vaughan, later Dean of the Department of Medicine and Surgery, was the first man to hold a professorship in physiological chemistry in a medical faculty in this country. Under the able leadership of Vaughan and of his pupil, Frederick George Novy ('86, Sc.D. '90, '91m, LL.D. Cincinnati '20), the subject was developed at the University as a part of the offerings of the combined Department of Bacteriology, Physiological Chemistry, and Hygiene. (For a discussion of the developments prior to 1922, see Part V: ADMINISTRATION AND CURRICULUM and DEPARTMENT OF BACTERIOLOGY.)

After the retirement of Dr. Vaughan in 1921, the feeling that the work in physiological chemistry, in view of its rising importance, could hardly be kept in the position of an adjunct to other subjects (*P.R.*, 1921-22, p. 88) led to the establishment of a separate Department of Physiological Chemistry by the Regents at their meeting of May 26, 1922. Howard Bishop Lewis (Yale '08, Ph.D. *ibid.* '13), of the University of Illinois, was appointed Professor of Physiological Chemistry to take charge of the new department. He had received his graduate training in physiological chemistry under Professors R. H. Chittenden and L. B. Mendel in the Sheffield Laboratory of Physiological Chemistry of Yale University and had taught in the Medical School of the University of Pennsylvania. In 1935, with the approval of the executive committee of the Medical School, the name Department of Physiological Chemistry was changed to Department of Biological Chemistry. It was felt that the broader term "biological" was more in keeping with the recent developments in this branch of chemistry.

The chief responsibility of the department, aside from research, has been the conduct of the courses in biological

chemistry for students of medicine. With the reorganization of the preclinical work of the School of Nursing, the department was requested to co-operate in the development of a survey course in chemistry for nurses, to include the fundamentals of inorganic, organic, and biological chemistry as a foundation for the clinical courses in medicine, therapeutics, and dietetics. Such a course, which included laboratory exercises, lectures, and recitations, was begun in the fall of 1925.

In 1928 the faculty of the School of Dentistry requested that arrangements be made to offer lecture instruction to students in dentistry, and with the institution of the four-year curriculum in dentistry, laboratory instruction was, in 1935, also made available to the students of this group. At the request of the School of Education, a course similar to that required of students in the School of Nursing, but slightly more inclusive, was offered in 1936 to professional students in the curriculum of physical education for women. The Department of Biological Chemistry, in addition to the instruction in the required courses in the Medical School, has thus co-operated with other professional groups—in nursing, dentistry, and education. In addition, many students in the College of Pharmacy, the College of Literature, Science, and the Arts, and the Graduate School elect courses and receive their instruction in sections with students of medicine. Biological chemistry is also included in the list of courses recommended for students qualifying for positions as hospital technicians and in related work.

Advanced students have been admitted to the department as candidates for the higher degrees of master of science and doctor of philosophy in the Graduate School. Many students in this group have served, at some period in their graduate work, as assistants in the

required laboratory courses for medical students. In the first fifteen years of its existence as a separate department, thirty-nine students received the degree of master of science, and thirty-two the degree of doctor of philosophy, in biological or physiological chemistry. These graduates are occupying important positions in university education or research in hospitals or research institutes, in government laboratories, and in commercial work.

In research, Associate Professor Adam Arthur Christman (Grinnell '17, Ph.D. Illinois '22) has studied various phases of purine metabolism and has published a new and simple method for the quantitative determination of carbon monoxide in blood—a method which has been employed extensively, particularly in medicolegal work. Associate Professor Henry Charles Eckstein (Illinois '15, Ph.D. Yale '23) has been an investigator in the field of lipids, and in 1925 he published the results of an exhaustive study of the composition of human fat. Along other lines, he has contributed to the knowledge of the sterols in epidermal structures, lipid metabolism in xanthoma, and the relation between the lipids of the diet and those of the tissues. Assistant Professor Herbert O. Calvery (B.S. Greenville '19, A.B. Illinois '21, Ph.D. *ibid.* '24), who studied in the Prague laboratories of Professor E. Waldschmidt-Leitz under the tenure of a Guggenheim fellowship, interested himself in the chemistry and enzymatic degradation of protein. His study of egg albumin was one of the first studies of the enzymatic hydrolysis of a native protein in which the newer methods of enzyme investigation were used. Miss Lila Miller (Wisconsin '26, Ph.D. Michigan '36), who worked in the Carlsberg laboratories under the direction of Professor S. P. L. Sørensen, continued these in-

vestigations. It is to be regretted that Professor Calvery resigned in 1935 to accept an important position in the laboratories of the federal government. He became chief of the Laboratory of Pharmacology of the Food and Drug Administration of the Department of Agriculture. Professor Lewis has been interested in protein metabolism, particularly in the two sulfur-containing amino acids of the protein molecule, and has published some thirty papers on sulfur metabolism. Important among these are his contributions to our knowledge of the "inborn error" of metabolism, cystinuria.

Members of the staff have served as officers of the professional societies of biological chemistry and on the editorial boards of various important journals concerned with biological chemistry and

related fields. Lewis has been a member of the National Board of Medical Examiners, serving also as a member of its examination committee. It is worthy of note that Dean Vaughan, whose work was so important to the development of instruction and research in physiological chemistry at the University of Michigan, was one of the original members of the National Board at the time of its foundation in 1915. Lewis has also been a member of the Council on Foods of the American Medical Association.

A detailed and illustrated account of the organization and of the instructional and research work of the department was published by the Rockefeller Foundation in 1930.

HOWARD B. LEWIS

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THE DEPARTMENT OF DERMATOLOGY AND SYPHILOLOGY

COURSES in dermatology and syphilology appeared in the curriculum of the Department of Medicine and Surgery in 1890. At that time Dr. William Fleming Breakey ('59m), who had previously been Preceptor of Surgery and Associate Demonstrator of Anatomy, was appointed Lecturer on Dermatology. Dr. Breakey held the position until 1905, at which time he was made Professor of Dermatology and Syphilology. He retained this professorship until he retired in 1912. It may be assumed that previous to 1890 any cutaneous problems which presented themselves were taught in one of the other major departments, presumably in the Department of Internal Medicine.

Dr. Breakey was born in Bethel County, New York, in 1835. After his graduation from the Department of Medicine and Surgery he practiced for a short time at Whitmore Lake. He served with distinction as Assistant Surgeon with the Sixteenth Michigan Volunteer Regiment during the Civil War and while he was in service suffered a serious bullet wound in his left thigh. This wound produced a chronic infection from which he suffered throughout the rest of his life.

A lifelong member of the local medical society, Breakey was honored by being made president of the Michigan State Medical Society in 1903. He was also honored by membership in the American Dermatological Association, to which he was elected in 1902.

Dr. Breakey was a man of delightful personality, whose graciousness and lovable qualities endeared him to all of his medical colleagues. During the seven years of his professorship the department

made commendable progress, and in 1912, when he retired because of ill-health, the Department of Dermatology and Syphilology at the University of Michigan was one of the few independent departments of dermatology and syphilology in medical schools in the United States.

After his retirement Breakey lived in Ann Arbor for an additional three years. He died in February, 1915, at the age of eighty. He is remembered as a loyal alumnus and a pioneer in a new field of medical practice.

In 1912, following Breakey's retirement, the professorship of dermatology and syphilology was filled by Udo Julius Wile (Columbia '04, M.D. Johns Hopkins '07).

Immediately after he had obtained his medical degree Dr. Wile had served as an intern in the Charité Hospital of Berlin for one year and had pursued graduate studies in dermatology and syphilology during the next eighteen months at the universities of Bern, Paris, and Berlin. At that time he also became a student of Professor Paul G. Unna, of Hamburg, in whose home he lived for several months. Upon his return to the United States he practiced in New York City until, at the age of thirty, he was appointed to a chair in the University. He began active service in September, 1912.

Owing to the cordial support of his colleagues and of the deans under whom he has served, Dr. Wile has been enabled to build upon Dr. Breakey's foundation one of the most active university clinics in dermatology and syphilology in the country.

Through the year 1937 twenty-seven

men had graduated from the service of dermatology of the department. Of this group several have reached national and international distinction. The first assistant of the department, Dr. John Hinchman Stokes ('08, '12*m*), after having established the syphilis and dermatology departments at the Mayo clinic, became Duhring professor of dermatology at the University of Pennsylvania, a position which he now holds. Dr. Stokes is an outstanding syphilologist and has achieved wide distinction, not only from the point of view of effective practice, but also from the point of view of public health. He is a member of the American Dermatological Association and in 1936 was elected its president.

Dr. Francis E. Senear ('12, '14*m*) has become a dermatosyphilologist of great distinction. He is professor of dermatology and syphilology at the University of Illinois Medical School and is in active practice in Chicago. Both Dr. Senear and Dr. Stokes have established schools of their own, properly trained graduates of which have already attained national reputations. Senear is a member of the American Dermatological Association and has been chairman of the Section of Dermatology and Syphilology of the American Medical Association.

Dr. Joseph Alexander Elliott (Southern University '10, Michigan '14*m*) was the third member of Dr. Wile's staff. He proved himself an excellent teacher, and during Wile's absence for military service during World War I, Elliott, as Acting Professor, carried the teaching and other responsibilities of the department with admirable executive ability. Dr. Elliott has been elected a member of the American Dermatological Association.

Dr. Lyle Boyle Kingery ('14, '16*m*), now professor of dermatology and syphilology at the University of Oregon, was the first member of the staff in the der-

matology and syphilology service to remain for the full period of four years and also the first to have reached professorial rank in the University. He is an admirable teacher and, in spite of a very heavy practice, has maintained his interest in scientific investigation. He has developed a strong department at his university and is considered one of the distinguished graduates of the department.

Kingery was followed by Dr. Harther Lewis Keim ('15, '17*m*, M.S. '23), who was with the department nine years and who also reached professorial rank. In addition to his service in the department and his contributions to the research and literature in this subject, Keim spent a year at the Union Pekin Medical College, China, as an exchange professor. Upon his return he established himself in practice in Detroit.

Dr. Carroll Spaulding Wright ('17, '19*m*), the sixth graduate of the department, was fortunate in securing Professor J. F. Schamburg of Philadelphia as his associate. Wright became assistant professor and subsequently associate professor in the Graduate School of the University of Pennsylvania, and was elected professor of dermatology and syphilology at Temple University Medical School.

The next man after Dr. Wright to achieve professorial rank was Dr. George H. Belote ('23*m*, M.S. '27). Belote entered the department in 1923, served successively as intern, resident, and instructor, and was appointed Assistant Professor in the department in 1928. In 1930 he was promoted to Associate Professor. He died in 1941. He was an admirable teacher and an excellent administrator, and he made signal contributions to the literature.

Among the other staff members who remained during the full period of internship and graduated are many who

have university associations and from whom it is expected and hoped that more will be heard.

The Department of Dermatology and Syphilology staff had in 1940, in addition to Wile, one associate professor, two instructors, a research assistant, two assistant residents, and two interns.

In the earlier days, the department was housed in a section of the hospital, but in 1918, upon Wile's recommendation, a separate building, affording 4,166 square feet of floor space, with room for twenty-five beds, was erected at a cost of \$7,445. The building was torn down in 1932, after the department was accommodated in the new hospital. Through the cordial co-operation of the University Hospital group, the department has adequate bed facilities and not infre-

quently has as many as sixty patients in the hospital at one time. The department maintains an active outpatient service visited by approximately nine thousand patients yearly.

Through the adequate budgets allowed the department it has been possible to keep pace with all of the newer methods of diagnosis and treatment. The department not only has been from the outset ideally equipped to perform its duties to the people of the state as a helpful integral part of University Hospital service, but also has been enabled to develop a comparatively new field and to equip young men to enter it with the scientific and practical background required of competent practitioners and teachers.

UDO J. WILE

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THE DEPARTMENT OF INTERNAL MEDICINE

I. THE PERIOD ENDING IN 1908

THE first step in organizing the Department of Medicine was the appointment in 1848 of Abram Sager (Rensselaer Polytechnic Institute '31, M.D. Castleton Medical College [Vt.] '35, A.M. hon. Michigan '52) as Professor of the Theory and Practice of Medicine. He had been Professor of Botany and Zoology since 1842, but apparently never conducted classes in medicine, as in January, 1850, Samuel Denton (M.D. Castleton Medical College [Vt.] '25) was appointed to the professorship in medicine as well as to that in pathology, and Sager was assigned to the professorship of obstetrics and diseases of women. In 1874 Sager was made Emeritus Professor, but he continued to act as Dean until June, 1875, when he resigned as a protest against the proposed establishment of a department of homeopathy in the Medical School.

The first active head of the Department of Medicine was Samuel Denton, who had been appointed Professor of the Theory and Practice of Medicine and Pathology in 1850. In 1837 he had been appointed one of the first Regents and he had served for three years; later, his interest in state politics led to service in the state Senate from 1845 to 1848.

According to Dr. William Fleming Breakey, Denton was very dignified in manner and always wore a high hat. He had a large general practice and was much sought in consultation, for he had an excellent reputation for sound judgment and skill in diagnosis and treatment. A great advocate of the use of alcohol in many types of illness, he especially recommended it in "consumption"

and in the later stages of protracted fevers. The discrepancy between his views and those of Dr. Alonzo B. Palmer, who bitterly opposed the use of alcohol in all forms, was quickly noticed by the students, who sometimes submitted written questions in class calling attention to the opposing opinions. According to Dr. Victor C. Vaughan, Denton "possibly had something to do with the inauguration of the Medical School, but so far as I can learn he contributed but little to its reputation" (Vaughan, *A Doctor's Memories*, p. 195). He died in Ann Arbor, August 17, 1860. To succeed him Samuel Glasgow Armor (M.D. Missouri Medical College '44, LL.D. Franklin '72) was, in 1861, appointed Professor of the Principles of Medicine and Materia Medica, although the title was changed at once, by his request, to Professor of the Institutes of Medicine and Materia Medica. He had held teaching positions in several middle western medical colleges and was in private practice in Dayton, Ohio, when he accepted the appointment, which he retained until the close of the session of 1867-68.

Dr. Armor, a man of great personal charm, was characterized as an able teacher and lecturer, although he will not be remembered as one who contributed importantly to the advancement of medicine. He made his home in Detroit and was in practice there, for a part of the time, in professional partnership with Dr. Moses Gunn, who was then Professor of Surgery in the University.

Alonzo Benjamin Palmer (M.D. College of Physicians and Surgeons [West. Dist., N. Y.] '39, LL.D. Michigan '81) became associated with the University

in 1854, when he was appointed Professor of *Materia Medica*, Therapeutics, and Diseases of Women and Children. Appointed Professor of Anatomy two years before, he was listed as "not on duty," presumably because of his desire to accumulate more funds before beginning an academic life. For a time Palmer attempted to maintain a residence in Chicago, but soon gave this up and came to Ann Arbor to live. On the death of Denton in 1860 he assumed the professorship of the theory and practice of medicine and of pathology and *materia medica*, becoming, a year later, Professor of the Theory and Practice of Medicine and of Pathology, in 1864 Professor of Pathology, the Practice of Medicine, and Hygiene, and in 1869 Professor of Pathology and the Practice of Medicine. His title from 1880 until his death was Professor of Pathology and of the Practice of Medicine and Clinical Medicine. Thirty-three years of his life were devoted to teaching medicine in the University; the last twelve of these he served as Dean.

During the years of his residence in Ann Arbor Dr. Palmer was an active member and vestryman of Saint Andrew's Church, where as a lay reader he often conducted services and taught a students' Bible class. With Mrs. Palmer he gave a substantial sum toward the erection of the church tower. After his return from Europe in 1879 he became a warm friend of Bishop Harris of the Detroit diocese and took the deepest interest in the founding of the Hobart Guild. In 1859, when he was forty-four, he made his first European trip. His diary shows that in London he attended clinics and lectures at Guy's Hospital, Saint Bartholomew's Hospital, the London Fever Hospital, King's College Hospital, Saint Thomas Hospital, Middlesex Hospital, and the Children's Hospital. He met many prominent medical men,

among them Charles Murchinson, famed for his studies on fevers and for emphasizing the importance of milk in the spread of typhoid fever. He spoke of having met Sir Benjamin C. Brodie, then seventy-six years of age, the president of the Royal College of Surgeons, and Sir Alfred B. Garrod, well known for his studies on gout.

After three months in London he spent five weeks in Paris. There he visited Charles Eduard Brown-Séquard, who succeeded Claude Bernard as the professor of experimental medicine in the Collège de France in 1878 and who is chiefly remembered for his experimental investigations of the nervous system. He also saw Auguste Nelaton, one of the surgeons to Napoleon III, and Alfred Armand Louis Marie Velpeau, surgeon at the Charité, well known for his work on surgical anatomy and his *New Elements of Operative Surgery*. Palmer was especially interested in the clinic of Pierre-Adolph Piorry, inventor of the pleximeter and a pioneer in mediate percussion. In his diary he recorded: "Piorry [is] famous for his percussion; pretends to tell more by percussion than anyone else, and probably can do it." This is of interest because Palmer was a master of physical diagnosis himself and drilled his students thoroughly in its methods. He also visited the clinic of Armand Trousseau, one of the leading clinicians and medical teachers of France.

In Dublin he spent a morning with William Stokes, regius professor of medicine, who, as early as 1825, had published an *Introduction to the Use of the Stethoscope*. He had also written on cholera, having observed the Dublin epidemic of 1832, and was well known for his description of the Stokes-Adams syndrome and for his contributions to the literature dealing with diseases of the chest, heart, and aorta.

As a delegate of the American Medical

Association, Palmer attended the meeting of the British Association for the Advancement of Science at Aberdeen, where he met and heard the most illustrious scientific men of Great Britain. Later, at Edinburgh, he called upon Sir James Young Simpson, one of the most remarkable personalities of his time, who was the first to employ chloroform as an anesthetic. He also made many contributions to obstetrics and gynecology and was greatly interested in improving the status of hospitals.

The European trip was doubtless a great inspiration to Palmer, for he came in contact with the finest type of physicians and medical teachers of Great Britain and France and visited most of the important hospitals and medical schools. Why he did not visit Germany is not known. The French, however, had contributed most of the advancements in medicine until about 1850.

On his return Palmer entered into his work with enthusiasm. Apparently he was an inspiring teacher; he sincerely enjoyed lecturing and was always ready to substitute for other lecturers in emergencies, or to add new lectures of his own if he thought there was a need for them. The memorial to him stated:

His lectures were at first fully written out but latterly he took briefer notes into the lecture room, carefully and systematically arranged. He never appeared before his class without looking over his notes and getting his subject well in hand; he was constantly rewriting and rearranging his lectures, to keep them abreast of scientific advancement. (*Memorial of . . . Palmer*, p. 167.)

That he was thorough and meticulous in the examination of patients may be surmised by his comments on Dr. Walshe, whose clinic he visited in London:

I have been particularly interested in Dr. Walshe's clinical exercises in the hospital. I have never witnessed more searching, exact, and intelligent examination of patients, par-

ticularly in all cases of diseases of the chest. Nothing could exceed the minute care exercised in physical explorations, and, so far as I could judge from witnessing his procedures, and hearing his remarks, with occasional examinations of particular sounds, he is unusually discriminative and precise in his observations, and very just in his conclusions. (*Memorial of . . . Palmer*, p. 27.)

Breakey says that Palmer was "energetic, ambitious, industrious, and loved teaching." To the alumni attending the Commencement of 1888, the year following Palmer's death, Dr. Elijah H. Pilcher characterized him as follows:

[He was] earnest and methodical, learned and painstaking, pure and stainless in his life, kindly and benevolent, tenacious of what he thought to be right, devoted to the interests of the University; for more than a generation of years he was one of the most conspicuous figures of the medical faculty. (*Memorial of . . . Palmer*, p. 170.)

Vaughan commented, in *A Doctor's Memories* (p. 199):

He drilled his students *ad nauseam* in the employment of instruments of precision; auscultation and percussion were not only his favorite hobbies, but in their use he showed great skill. I remember how proudly he exhibited to me the first laryngoscope I ever saw.

Although he was an ardent Whig and abolitionist, his Civil War service was relatively brief. He resigned a commission as surgeon of the 2d Regiment of Michigan Volunteers on September 23, 1861, after a service of five months, to resume his University teaching.

In 1863 he accepted the chair of the theory and practice of medicine at the Berkshire Medical College in Pittsfield, Massachusetts, and during his first summer of service there also gave the lectures on materia medica. The plan of holding two professorships simultaneously at different medical institutions was not

unusual and apparently was sanctioned by the University. At least two other medical teachers of the University had a similar arrangement: Corydon L. Ford, Professor of Anatomy, lectured in his subject at the same institution, and Armor, Professor of the Institutes of Medicine and Materia Medica, lectured at the Long Island Hospital Medical College. This arrangement was possible because the University's term of medical instruction lasted only six months. In 1877 the annual term of the Medical Department at Ann Arbor was extended to nine months, causing a conflict with Palmer's chair of the practice of medicine in the Medical School of Maine, which he had held since 1869. During the school year 1877-78, by lecturing twice daily, he managed to give the full number of lectures at both places.

At the suggestion of many of his former pupils Palmer wrote a textbook, *A Treatise on the Science and Practice of Medicine*, which appeared in 1883 in two volumes of about nine hundred pages each. Although its immediate reception was flattering this work could not be regarded as a great success. According to Vaughan, "Had it been presented fifteen years earlier it would have had a wide circulation, but it came just when the *new* medicine was supplanting the *old* and is now unknown and unused" (*A Doctor's Memories*, p. 199).

Dr. Palmer was not a prolific writer, as there are only twelve publications recorded in his memorial book. They deal with homeopathy, the effects of alcohol and temperance teachings, the cause of typhoid fever, sulphate of quinine, epidemic cholera, the treatment of inflammation of internal organs, and medical teaching. His president's address before the Michigan State Medical Society in 1873 had the title, "Law and Intelligence in Nature, and the Improvement of the Race in Accordance with Law."

During the last decade of Palmer's life many changes occurred in the Medical School which had his support and the benefit of his influence. Two pavilions were added in 1876 to the residence which served as a hospital on the north side of the campus, and this greatly increased the bed capacity; in 1877 the sessions were extended from six to nine months; in 1880 attendance for three years was required for graduation; a more extended course in physiological chemistry was begun in 1878; and in 1879 practical work in physiology was instituted (the course in physiological chemistry had previously been limited to urinalysis).

The following items from the *Calendar* of 1884-85 illustrate the subjects considered as belonging to the department and the time devoted to them: Urinalysis, twelve weeks of afternoon work; Physical Diagnosis, thirty-two hours in lecture room and hospital; the Practice of Medicine, 180 hours in the general lecture room; and Clinical Medicine, 148 hours in the Hospital amphitheater.

After the death of Dr. Palmer in 1887, Dr. Henry Francis LeHunte Lyster ('58, '60m, A.M. '61) was made Professor of the Theory and Practice of Medicine and Clinical Medicine, and he served in this capacity in 1888-89 and in 1889-90. Apparently he continued his practice in Detroit while he was head of the Department of Medicine in the University. It was during Dr. Lyster's regime that the separate Department of Pathology was created.

No professor of internal medicine was appointed for the year 1890-91, but the acting head was Dr. Walter Shield Christopher (M.D. Medical College of Ohio [Cinn.] '83), who was listed as Lecturer on the Theory and Practice of Medicine and Clinical Medicine. Dr. George Dock's explanation was as follows:

All professors were elected as lecturers and only given the title of Professor if, toward the end of the year, they were recommended for full title with indefinite tenure. Christopher was a very bright fellow but more interested in pediatrics. He went to Chicago in 1891 and became a very popular consultant, but died young.

George Dock (M.D. Pennsylvania '84, A.M. hon. Harvard '95, Sc.D. hon. Pennsylvania '04) was the next appointee to the chair of the theory and practice of medicine and clinical medicine. This was an important appointment, as he probably contributed more to the development of the department than any other professor before or since. In addition to his remarkable natural ability as a physician, teacher, and investigator, he had received the advantages of the best medical education obtainable at that time. After his graduation from Pennsylvania, he served as an intern at Saint Mary's Hospital in Philadelphia and then spent two years in study at Berlin, Leipzig, Frankfurt, and Vienna. Medicine at this time was developing at a rapid rate, and German medicine was conceded to be the most progressive in the world. Dock returned to Philadelphia in 1887 as an assistant in clinical pathology, under the influence of William Osler and John M. Musser, two of the most inspiring medical teachers of all time. These experiences must have had a large share in developing his scientific knowledge and his teaching ability, which endeared him to many classes of students at the University.

The status of the Department of Medicine apparently was none too satisfactory in the few years prior to Dock's arrival. At the time of his appointment, the *Michigan Daily* reported that the chair of the theory and practice of medicine had had a "checkered career, as more than the ordinary changes [had]

caused a feeling of uncertainty in the minds of the medical students. This feeling [had] been dissipated by the appointment of Dr. Dock." He took up his work in September, 1891. In the following year Aldred Scott Warthin (Indiana '88, Michigan '91m, Ph.D. *ibid.* '93, LL.D. Indiana '28) was appointed Demonstrator of Clinical Medicine. According to Dock:

There were no available doctors in the city to act as volunteers and on account of my late appointment there were no senior men available to assist with the teaching. Warthin and I were literally on full time, working in the hospital or on outpatients from eight to six, and often seeing patients at night.

The condition of affairs on his arrival may be summarized by his own words:

Before my time medical patients were rarely admitted to the hospital. The space was filled with operative cases. When I arrived on the ground there were no medical patients in sight, and I gave my first clinic on a private patient of Dr. Breakey who had pleurisy with effusion. Very soon we sent out, with the consent of the faculty, letters to physicians and preachers saying that there was an outpatient service in the hospital for medical cases and that the attendants (Warthin and I) would see indigent patients or any referred by physicians at their homes. We quickly gathered up a lot of good stuff. (From a letter written on March 1, 1937, to Richard C. Boelkins, a fourth-year medical student at the University.)

During Dock's early days at the Hospital the clinical facilities of the Medical School were greatly improved by the completion of the Catherine Street Hospital in December, 1891, providing at first sixty-four beds. This was later known as the West Hospital.

Dr. Dock will be remembered for his many fine qualities and for the important innovations he introduced into medical teaching at the University. He was chiefly instrumental in organizing lab-

oratory methods of teaching and in reorganizing the course in auscultation and percussion. He likewise insisted that the work in medicine should not consist of the repetition of lectures in two successive years, as had previously been the custom.

His bibliography for the eighteen years he was on the staff of the Medical School contains eighty-three medical articles. They deal with many different topics and indicate his thorough knowledge and broad interest in clinical medicine. Among the subjects to which he made original contributions were chloroma, leukemia, Banti's disease, Hodgkin's disease, malaria, amoebic dysentery, osteomalacia, endocarditis, coronary thrombosis, tuberculosis, diabetes, and lobar pneumonia. In addition, he wrote the section dealing with endocrinology in Osler's *Modern Medicine*, published in 1909 and recognized as the leading system of medicine in the English language at that time. Dock edited and contributed additions to the volume *Diseases of the Heart* (1908), in Nothnagel's *Encyclopedia of Practical Medicine*, which was the translation of one of the outstanding systems of medicine published in Germany. Dr. Dock's interest in tuberculosis is shown by his publications on this subject, including one in 1902 on "Some Reasons Why There Should Be a Hospital for Consumptives in Connection with the University Hospital."

His wide interest in the constant advances of medicine led him, in association with Vaughan and Warthin, to devote much time and thought to the development of the Medical Library. As a result, early in the history of the Medical School a remarkably complete library was organized. His interest in this work led in 1907 to an article on "The Medical Library of the University of Michigan."

Many young medical students, stimulated by Dock's teaching, later came to

occupy positions of prominence in this country. Dr. Aldred Scott Warthin, one of his first associates, became Professor of Pathology in the University. Dr. David Murray Cowie became Instructor in Pediatrics in 1905, and in later years served as Professor of Pediatrics and Infectious Diseases and head of that department. Dr. James Rae Arneill (Lawrence '90, Michigan '94m, LL.D. Lawrence '23), of Denver, Colorado, was Instructor in Internal Medicine from 1898 to 1903, and later became professor of medicine at the University of Colorado. Dr. Roger Sylvester Morris ('00, '02m) was later associated with the Medical Department of Johns Hopkins University and finally became professor of medicine at the University of Cincinnati. Dr. James Gerrit Van Zwaluwenburg ('98, '08m) became Professor of Roentgenology in the University. In addition to the group named, many others who were his students and who in some instances were associated with him on the staff of the Department of the Theory and Practice of Medicine went to different parts of the country and became the leading consultants and practitioners in their communities.

In 1896 Dr. Dock was offered a position as professor of medicine at Jefferson Medical College in Philadelphia, but he declined it. He left in 1908 to become professor of medicine at Tulane University, and later accepted a chair in Washington University, St. Louis, which he resigned in 1922 to take up private practice in Pasadena.

CYRUS C. STURGIS

II. THE YEARS 1908-27

After the resignation of Dr. Dock, the dean and faculty of the Medical School (then called the Department of Medicine and Surgery) attempted at first to obtain Dr. Rufus Cole of Johns Hopkins University as his successor. In

declining their offer Cole mentioned Albion Walter Hewlett (California '95, M.D. Johns Hopkins '00) as a possibility and recommended him in the highest terms to the Regents, who in 1908 appointed him Professor of Internal Medicine and Director of the Clinical Laboratory. This position he held until 1916, when he resigned to become professor of medicine at Leland Stanford Junior University. While at Ann Arbor Hewlett made a rather extensive study of the blood flow in the arm in various clinical conditions and wrote a book on the *Functional Pathology of Internal Diseases*, accepted as an authoritative work on this subject.

Hewlett was one of the first men appointed to the chair of medicine in an important medical school whose chief interest lay in the functional rather than in the structural aspects of disease—in pathologic physiology rather than in pathologic anatomy. He had a strong instinct for research, and his reputation rested more upon his attainments in the field of productive scholarship than upon his renown as a clinician. During his stay at Ann Arbor he was continuously engaged in research himself and did his utmost to stimulate his assistants to do likewise. Although the salary he received from the University was small, judged by present standards, he refused to open an office for the practice of medicine and would not grant this privilege to his assistants.

Dr. Hewlett was not a spectacular teacher or clinician, unlike Dr. Dock, whose striking personality immediately made a strong and lasting impression upon those who came in contact with him. One of Hewlett's most striking traits was his intellectual honesty. When he made a mistake in diagnosis he acknowledged it freely and without embarrassment and never offered an excuse. His mind was of the very first caliber,

but he never paraded his knowledge or sought to dramatize his lectures and clinics. In his character there was no taint of selfishness. He took pride in the accomplishments of his assistants, and when he worked with them on a problem or directed their research he saw to it that they received more than their full share of credit for the work done. When the time came for them to leave the department he did all in his power to help them pursue their chosen careers and followed their progress with great personal interest.

Of the men who were associated with Dr. Hewlett, Dr. James Howard Agnew ('07, A.M. '08, '10m) became, for a time, professor of medicine at the University of Alabama; Dr. Luther Fiske Warren ('07, '09m), professor of medicine at Long Island Medical College; and Dr. Van Zwaluwenburg, Professor of Roentgenology in the University.

Soon after his arrival at the University Hewlett called attention to a recent epidemic of scarlet fever in the medical wards and pointed out the great need for a contagious hospital. It is not surprising, in view of what has been said of his chief interests, that in a discussion as to whether the primary function of the University Hospital was to supply the Medical School with the clinical material necessary for the instruction of its students and for the investigation of disease, or whether one of its major functions was to furnish medical service to the citizens of the state of Michigan, he championed the former view.

When he first came to Michigan the instruction in the Department of Medicine was confined to the junior and senior years. A junior course in clinical microscopy, given four times a year and once during the summer session, had as its purpose instruction in the technique employed in the examination of the blood, sputum, stomach contents, and excreta,

and dealt also with the diagnostic significance of the data furnished by these methods. It was under the charge of the junior instructor in the department and was given in turn by Dr. Warren, Dr. Harry Burke Schmidt ('11m), Dr. Frank N. Wilson ('11, '13m), and Dr. Quinter Olen Gilbert ('09, A.M. '10, '14m). In a second junior course, at first called Auscultation and Percussion and later Physical Diagnosis, instruction was given in the technique of the physical examination of the patient and in the interpretation of the data obtained. This course was conducted at first by Van Zwaluwenburg and later by the senior instructor in the department.

A third course consisted in the presentation of typical cases illustrating the more common internal diseases occurring in the Hospital. At each meeting the class was quizzed on the subject presented at the preceding meeting. These clinics, given by Dr. Hewlett, covered etiology, symptomatology, and physical signs. Differential diagnosis and treatment were left for consideration in the senior year. A second part in this course, given by an assistant, consisted in assigned reading, quizzes, and frequent written tests, and dealt with diseases less common and not ordinarily encountered in the Hospital. This didactic work was later given up in favor of additional clinics.

In the senior year Dr. Hewlett gave two clinics weekly, at which cases were presented and the diagnosis, differential diagnosis, and appropriate treatment were fully discussed. On each clinic day he selected the cases and spent some time in preparing his material. The major course of the senior year was "case taking," in which the students, by sections, were assigned the patients admitted to the medical wards. Ordinarily the students worked in pairs, were responsible for the history and routine laboratory tests, and were expected to

complete these with as great dispatch as possible. The data collected by them were incorporated in the Hospital records, and their work was supervised but was not repeated by the house officer in charge of the ward. The students were also expected to make a complete physical examination and to keep progress notes, but this material was collected solely for their own use and did not become a part of the permanent record. During daily ward rounds by Hewlett or the senior instructor the students presented their cases for discussion.

For a number of years a "medical staff" was appointed, consisting of a small group of students, selected because of their scholastic standing or interest in internal medicine. These students were assigned medical cases throughout the year instead of merely during the period when the section to which they belonged was on the medical wards. Hewlett made special rounds each Sunday morning for their benefit, and the cases assigned to them were then presented.

In 1911 an introductory course in physical diagnosis for sophomore students was given for the first time by Dr. Warren. It was continued by the junior instructors who followed him. In 1915 Hewlett offered a one-hour course in pathologic physiology.

Up to this time very little provision for the care of outpatients had been made in the Department of Medicine. In a small room adjoining the office of the Department of Neurology an occasional outpatient was seen by the assistant in medicine, but the number of outpatients gradually increased, and it became necessary to make some provision for them. After declining an offer from the University of Minnesota in 1915-16 Dr. Hewlett requested and received a special appropriation for the construction of an outpatient service in the basement of the medical wing of the old University Hos-

pital. Shortly after this he accepted the chair of medicine at Leland Stanford.

Dr. Hewlett was succeeded by Nellis Barnes Foster (Amherst '98, M.D. Johns Hopkins '02), who had pursued post-graduate studies in various European institutions before becoming associated with Cornell Medical College in New York City.

Foster arrived in Ann Arbor in the fall of 1916 and found the department established in the old Medical Ward, which burned in 1927. This building had twenty-three beds, and there was no formal outpatient service. A small room, measuring about five by ten feet, provided the only available space for experimental work. From this the work in experimental medicine developed. In order that the department could have more space Vaughan permitted Dr. Louis Harry Newburgh (Harvard '05, M.D. *ibid.* '08) to work in the Hygienic Laboratory in the basement of the West Medical Building.

Shortly after Dr. Foster arrived he was assigned space in an old building which had formerly housed the Hospital laundry, and the Regents appropriated about \$2,000 for the purchase of laboratory equipment for it. The one large room of this building was over the Hospital furnace and was very hot in summer, especially as the structure also had a sheet-iron roof. The room was so dark that it was necessary to have the electric lights turned on in the middle of the day. An L-shaped room was partitioned off, and arrangements were made to divide it into four small laboratories. Small experimental animals, such as guinea pigs and rabbits, were kept at one end. The remainder of the room was used for teaching purposes.

Dr. Foster had a very high regard for Vaughan, Novy, Warthin, Huber, and others of the faculty, and it was, perhaps, on account of their reputations

that he was attracted to Ann Arbor. He was full of enthusiasm and did much teaching. He acted in consultation with Dr. Newburgh and Dr. Mark Marshall (Earlham '02, Michigan '05, '08m), each of whom had charge of a ward.

Dr. Foster had served in his position for only five or six months when the United States entered World War I. Shortly afterward he suddenly left the University, as a result of a misunderstanding with Dr. Vaughan, who was then Dean, and joined the Medical Corps of the United States Army. The differences with Dr. Vaughan probably were not initiated by Dr. Foster, and apologies were offered to him later. He was a most pleasing type of physician, exceedingly well grounded in clinical medicine, and beloved by all members of the department.

When Dr. Foster left Ann Arbor, Newburgh was advised by Vaughan that he was to be the acting head of the department, but was cautioned that he could not have a free hand in conducting the department, as he could not have control of its budget, and that he would not have the privilege of recommending new appointments. Newburgh was then made chairman of a committee to select a successor, but after considering several physicians of prominence in the Middle West and East, the committee was discharged, as it could not obtain a suitable man for the position.

Newburgh had come to the University of Michigan in 1916 as Assistant Professor of Medicine, upon the recommendation of Foster. He had served for four years as alumni assistant at the Harvard Medical School, working with Dr. James Howard Means, later professor of medicine at that institution, and Dr. William Townsend Porter, then professor of physiology. His investigations during this interval were concerned chiefly with studies on the respiration,

the circulatory rate, and the effect of strychnine on the blood pressure in patients with pneumonia. Upon arrival in Ann Arbor he immediately began to develop an experimental laboratory which, as a result of his efforts, has now grown into the splendidly equipped nutrition laboratory that functions as a unit of the Department of Internal Medicine. Dr. Newburgh served as active head of the department in 1917-18, and was appointed Professor of Clinical Investigation in Internal Medicine in 1922.

Hugh Cabot (Harvard '94, M.D. *ibid.* '98), then Dean of the School, in his report to the President for 1921-22 stated: "It is believed to be essential for the satisfactory conduct of this Department that we should obtain the services of a well-trained physician with broad clinical experience and a wide knowledge of the practice of medicine." He recommended Louis Marshall Warfield (Johns Hopkins '97, M.D. *ibid.* '01), stating that "his experience in the practice of medicine and as a consultant assures us a broad type of approach in the problems of medicine." Dr. Warfield's appointment began in 1922, and he continued to serve as Professor of Internal Medicine and head of the Department of Internal Medicine until 1925. He was not happy in his position at the University, however, because of certain changes occurring in the School and because of various controversies which had arisen, both before and after his arrival in Ann Arbor. He resigned in 1925 and returned to his practice in Milwaukee.

Warfield was followed by Preston Manasseh Hickey ('88, M.D. Detroit College of Medicine '92), Professor of Roentgenology, who kindly consented to be temporary administrative head of the department until a suitable successor to Warfield could be appointed.

James Deacon Bruce (M.D. Detroit College of Medicine and Surgery '96)

was Director of the Department of Internal Medicine for the years 1926-28. He resigned to become the Director of Postgraduate Medicine and Vice-President of the University in charge of University relations. During his directorship of the department, the Tuberculosis Unit was started, an allergy service was developed, and the Simpson Memorial Institute was built.

FRANK N. WILSON

III. THE PERIOD SINCE 1927

The present Director of the Department of Internal Medicine and Director of the Thomas Henry Simpson Memorial Institute for Medical Research is Cyrus Cressey Sturgis (Washington '13, M.D. Johns Hopkins '17). Before coming to Michigan in 1927 as Professor of Medicine and Director of the Simpson Memorial Institute he was a member of the faculty of the Harvard Medical School and physician of the Peter Bent Brigham Hospital in Boston.

The last year that Dr. Bruce was Director of the Department of Internal Medicine, there were twenty-eight members of the staff—a director, two professors, three assistant professors, eight instructors, one instructor in dietetics, four research assistants, one assistant, and eight interns. During the following year, 1928-29, the medical staff was increased to three professors, four assistant professors, fifteen instructors, eight senior interns, and eight junior interns, a total of thirty-eight. All members of professorial rank of the original staff were retained, with the exception of John Barlow Youmans (Wisconsin '15, M.S. *ibid.* '16, M.D. Johns Hopkins '17), who resigned to accept an assistant professorship in internal medicine at Vanderbilt University.

Among the additions to the professorial staff of the department in 1928 was Charles Leonard Brown (Oklahoma '19,

M.D. *ibid.* '21), who had been an instructor in the Harvard Medical School. He came to the University as Assistant Professor of Medicine.

The Department of Internal Medicine had previously been divided into several services, consisting of a service in metabolism headed by Dr. Newburgh, a cardiology service under the directorship of Dr. Wilson, a private medical service which had been directed by Dr. Bruce, and a tuberculosis service under the directorship of George Alexander Sherman (McGill '19, M.D. *ibid.* '24). During the year 1928-29 Sturgis combined the cardiology, metabolism, and private medical services with those of general medicine. This allowed Newburgh, Wilson, and their staffs ample opportunity to continue with the excellent experimental work that they had done in the past and which they had found difficult to continue because of the heavy clinical load they were required to carry.

John Blair Barnwell (Trinity College '17, M.D. Pennsylvania '23) was brought to the department as Director of the Tuberculosis Unit in November, 1928. He had been research instructor in pediatrics at the University of Pennsylvania, and a fellow and acting first assistant of the Trudeau Foundation.

With the addition of the special branches of medicine to general medicine it became necessary to reorganize teaching on the various medical wards. In order to facilitate handling the large number of students at that time, the medical service was divided into four general medical services, a medical outpatient service, a private medical service, a tuberculosis service, and a diabetic outpatient service. The work of the students was divided equally among the four services. They devoted half of their time to the medical section on the wards, and each group alternated between two instructors. The other half of the time in

the medical section was spent in the private medical service, the tuberculosis service, the diabetic outpatient service, and the medical outpatient service. The new arrangement allowed more individual attention for each student and more cases for the student to examine than had heretofore been possible. The general medical services were also reorganized so that each attending man who taught the senior students was a member of the permanent staff and of professorial rank. His assistant was a third- or fourth-year staff member of the rank of instructor who also taught the junior section in the afternoon. Each ward was under the direction of an assistant resident and an intern. Better care of ward patients was possible, and teaching for both the student groups and the younger staff men was more comprehensive and individual.

The department by 1940 had a staff of fifty-one members—three professors, six associate professors, five assistant professors, seventeen instructors, three research fellows, one instructor in dietetics, nine senior interns, and seven junior interns. The large staff made it possible to provide postgraduate instruction for the younger members. Interns were selected, who, if they were satisfactory, could be given a total of four years' training in internal medicine. Such an opportunity for postgraduate training greatly increased the number and quality of men who applied for internship in the department. In the early period of Dr. Sturgis' directorship of the department it was difficult to obtain men of the first rank for appointment to the intern staff. The situation changed greatly, until in 1937 sixty-five applications were received for seven internships; many of the applicants were in the first 10 per cent of their respective classes, and most of the best medical schools in the country were thus represented.

During the first thirteen years Dr.

Sturgis was Director a number of the younger men were appointed to professional positions elsewhere. Dr. Wilson, Dr. Newburgh, Dr. Paul Shirmer Barker (Westminster '15, M.D. Washington University '20), Dr. Henry Field, Jr. (Syracuse University '16, M.D. Harvard '20), Dr. Herman H. Riecker (Marietta College '17, M.D. Johns Hopkins '23), and Dr. Arthur Covell Curtis ('23, '25*m*), all members of the earlier medical staff, were still active in the department as of 1940.

In addition to providing the routine teaching of medical subjects the department has doubled the length of the courses in clinical microscopy and physical diagnosis, and numerous elective courses are offered to students interested in the various special phases of general medicine. The Department of Internal Medicine teaches more hours a year than does any other department in the Medical School. That such teaching has not been burdensome to students can be seen in a statement in "A Criticism of the Teaching at the University of Michigan Medical School by the Class of 1935": "In general, we feel from the standpoint of teaching, that the Department of Internal Medicine is outstanding in the Medical School. . . ."

Several services of the department benefited during the thirties, either by new accommodations, marked growth, or special grants. Two additional floors costing \$250,000 were erected on top of the Hospital to serve as a new unit for the care of patients with pulmonary tuberculosis. The floors were first occupied by patients in July, 1931. Accommoda-

tions were provided for ninety-eight patients in six single-bed rooms, ten two-bed rooms, and seventy-two four-bed rooms. Ample teaching rooms and work-rooms for examinations, treatments, laboratory work, and fluoroscopy are also available.

The allergy service has slowly grown from a part-time interest of one man in 1927 until it occupies three rooms on the second floor of the Hospital and has a permanent staff of three men and, in addition, one man part time.

The diabetic service has likewise slowly grown until now it has entire care of all diabetic patients assigned to the department and also supervises the care of all diabetic patients on services other than the medical service.

It was found possible in 1936 to rotate the senior instructors who were members of the medical service, in periods of a month each, through the electrocardiographic service, the allergy service, and the Simpson Memorial Institute. This allowed these men to spend all of their time for the period in pursuing the special work given in the three divisions and greatly added to the training that they received.

In 1937 one million dollars was appropriated from the Horace H. Rackham Fund, the interest on which was to be used for a period of not less than five years and not more than ten years, for the study of arthritis. This work was organized in the University Hospital under the directorship of Dr. Richard Harold Freyberg ('26, '30*m*).

ARTHUR C. CURTIS

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THE DEPARTMENT OF MATERIA MEDICA AND THERAPEUTICS

MATERIA medica has always been considered one of the fundamental subjects to be included in the curriculum of a medical school. Accordingly, when the Department of Medicine and Surgery of the University of Michigan was organized, one of the first chairs to be established was that of materia medica.

Jonathan Adams Allen (Middlebury '45, M.D. Castleton Medical College '46) was appointed Professor of Pathology and Physiology in January, 1850, and the first medical students came in October of that year. Inasmuch as materia medica, as it was then taught, did not require a previous training in physiology but was closely allied to chemistry, it was given early in the medical course. The first class consisted of ninety-

one students and five special students. The *Catalogue* of 1850-51 contained the statement that clergymen, lawyers, and medical graduates might enroll as "honorary" medical students. In 1852-53 the duties of Registrar of the Faculty of the Department of Medicine and Surgery were added to those of Allen's professorship, and the next year his title was changed to Professor of Therapeutics, Materia Medica, and Pathology.

In 1854 Alonzo Benjamin Palmer (M.D. College of Physicians and Surgeons [N. Y.] '39, A.M. hon. Nashville '55, LL.D. Michigan '81) was appointed Professor of Materia Medica, Therapeutics, and Diseases of Women and Children; he retained this title until 1861, when for one year he held another composite chair as Professor of Theory

and Practice of Medicine and Pathology. The University *Catalogue* of 1852-53 directed that students be examined in anatomy, physiology, materia medica, and chemistry.

The beginnings of the materia medica museum were indicated in the *Catalogue* of 1857-58, in the following statement:

Instruction in Materia Medica is greatly increased by importation from Paris of an extensive "suit" of rare and pure chemicals and of the various articles of organic materia medica put up in a beautiful and uniform style. Specimens of crude materia medica are constantly being added.

Many of these specimens are still in the department (1940), and the story connected with them, as related by Cushny, is not without interest. They were ordered in 1825 from Paris, by the University of Louisiana. When they were ready for shipment that university, having gone into bankruptcy, could not pay for them, and they were bought by the University of Michigan. The jars were each labeled with the name of the specimen, and "University of Louisiana" was permanently etched or painted on the inside of the jar, but on the outside of each is a small slip of paper, with "Michigan" printed upon it, pasted over the word "Louisiana." The specimens are of interest from the historical point of view only.

The museum was referred to in subsequent University catalogues, and it evidently was considered of some importance. The 1873-74 *Calendar* spoke of the "beautiful glass-covered half gallon jars, of uniform appearance, finely displayed . . . besides about one thousand other specimens of *Simple Mineral and Vegetable Substances* arranged in groups convenient for study."

In 1861 Samuel Glasgow Armor (M.D. Missouri Medical College '44, LL.D. Franklin '72) was appointed Professor of Institutes of Medicine and Ma-

teria Medica. Armor occupied the chair until 1868, when Henry Sylvester Cheever ('63, A.M. '66, '67m) was made Lecturer on Therapeutics and Materia Medica. In 1870 Dr. Cheever was appointed Professor of Therapeutics and Materia Medica, and in 1872 the words "and Physiology" were added to his title.

During these years, the textbooks of Biddle, Waring, and Ringer were recommended, and, in addition, the following were recommended for special subjects; Headland, *The Action of Medicines*, Anstie, *Stimulants and Narcotics*, and Harley, *The Old Vegetable Narcotics*.

Frederic Henry Gerrish (Bowdoin '66, A.M. *ibid.* '67, M.D. Medical School of Maine '69, LL.D. Michigan '05) was associated with Cheever in the department, in 1873-74, as Lecturer on Therapeutics, Materia Medica, and Physiology. In 1874 Gerrish was appointed Professor of Therapeutics, Materia Medica, and Physiology, in place of Cheever, who was on leave of absence from the University because of poor health. Cheever resigned in March, 1876.

In 1876 George Edward Frothingham ('64m) was appointed Professor of Materia Medica, Ophthalmology, and Aural Surgery; his title was expanded in 1880 to include clinical ophthalmology, and he continued to occupy this chair until 1889.

When an optional third year of medical study was first offered, in 1876, chemistry, anatomy, physiology, and materia medica were still being given in the first year of the three-year curriculum, but these subjects were reviewed in the second year, and examinations upon them might be passed at the end of that year. Two courses of lectures in materia medica were given, each course containing sixty lectures.

Since Frothingham's professorship was a rather comprehensive one, it is not sur-

prising that he had an assistant as early as 1880. Dr. Fred N. Baker (B.S. Cornell '78, Michigan '80m) acted as his assistant in 1880-81. The name of Dr. John G. Kennan (Western Reserve '79, Michigan '81m) appeared in the *Calendar* of 1881-82 with the title, Assistant to the Professor of Materia Medica and Ophthalmic and Aural Surgery.

In 1882 Dr. Kennan was succeeded by Dr. Harold Gifford (Cornell '79, Michigan '82m, A.M. hon. '12); in 1883 the post was occupied by Dr. Charles Marshall Frye ('82m), who was succeeded in 1884 by Dr. Arthur E. Owen.

The name of Victor Clarence Vaughan (Mt. Pleasant College [Mo.] '72, Ph.D. Michigan '76, '78m, LL.D. '00) appeared in the list of those teaching in the department in 1883-84, when to his duties as Professor of Physiology and Pathological Chemistry were added those of Associate Professor of Therapeutics and Materia Medica. Vaughan was associated with the department for three years with this title; Dr. Owen remained as his assistant for two years and then was succeeded by Dr. John Heman Andrus ('85m).

In 1887 Dr. Conrad Georg, Sr. ('72m), was appointed Instructor under Dr. Frothingham, and Dr. Thomas Charles Phillips ('85, '87m) was Assistant. The following year (1888-89) was the last in which Dr. Frothingham remained with the department. In 1889-90 Dr. Georg took entire charge of instruction in the subject. This was an important year in the history of the department, as it was the last in which the old subject of materia medica was taught as such, for in the following year the new subject of pharmacology was brought to this country, and to the University, by John Jacob Abel. In the last year under Georg, Materia Medica was a course completed in the first year, and Therapeutics was given in the second year.

Pharmacology in the modern sense in the University of Michigan may be said to date from July, 1890, when the Regents established the chair of materia medica and therapeutics in the Department of Medicine and Surgery and appointed John J. Abel to this new chair as Lecturer, at an annual salary of \$2,000. In June, 1891, Abel was appointed Professor of Materia Medica and Therapeutics. The Regents chose to retain the old title of materia medica and therapeutics for the new chair rather than to adopt the name "pharmacology." In this way they linked the new science with the old historical subject which had been taught in this school since it was opened in 1850, and with the name which had been employed to designate this older subject since the days of Dioscorides.

John Jacob Abel ('83, M.D. Strassburg '88) was born in Cleveland in 1857. Before his graduation from the Literary Department of the University in 1883, he withdrew to become principal of the LaPorte High School, LaPorte, Indiana, for three years. When he returned, while finishing his senior work, he was an assistant to Victor C. Vaughan during the first semester and to Henry Sewall, Professor of Physiology, in the second. He then went abroad and studied in various European universities. While still engaged in these studies, in 1888-89, he received a cablegram from Vaughan offering him the professorship of pharmacology in the Department of Medicine and Surgery. Acting on the advice of the biochemist, von Nencki, of Bern, with whom he was working at the time, he accepted the call and arranged to begin his new duties in January, 1891. In his first lecture he told of his recent visit to Berlin, where he had spent some weeks investigating the new remedy, tuberculin, which Koch had recently introduced for the treatment of tuberculosis.

Dr. Abel's first task was to fit up a laboratory, inasmuch as there had never been any provision made for experimental work in the old Department of *Materia Medica*. Not only was there no room, but there was not a single piece of apparatus, not even a piece of glassware. He finally secured a small room with a sloping ceiling, situated in a corner of the rear of the old Medical Building under the lower amphitheater. The necessary glassware was borrowed from Professor Paul C. Freer of the Department of Chemistry, and the physiological apparatus was built partly by Dr. Abel, with the aid of his assistant, Archibald Muirhead, and partly by the University mechanics. For the remainder of the year he lectured for an hour daily to a class that included, besides the medical students, the students in pharmacy and in dentistry. As it was not found satisfactory to include the dental and pharmacy students in the same class with the medical students, a separation was effected, and the following year the dental and pharmacy faculties assumed responsibility for the instruction of their own students in the subject.

During the academic year 1891-92 Abel was given additional laboratory space—a fairly large room in the southeast corner of the second floor of the Old Medical Building.

In the course of the year he organized a journal club, inviting ten to fifteen of the better students to meet with him at intervals to discuss more in detail than was possible in class and laboratory the various problems and aims of pharmacology. He was interested also in bringing a knowledge of pharmacology to the attention of practicing physicians. Accordingly, he arranged a lecture and demonstration for the physicians of Ann Arbor, and, later, a similar lecture and demonstration were given to the physi-

cians of Detroit. These lectures were published in an article in the *Pharmaceutical Era* in 1891. The period of Dr. Abel's service to the University of Michigan was destined not to be long, for in 1893, when the faculty of the medical school of Johns Hopkins University was being organized, he was invited to become one of its members as professor of pharmacology and professor in charge of physiological chemistry.

It is evident that, even though Abel's term was short, his service to the Medical Department of the University was of the greatest importance. He was one of the first of the remarkable group of men that Dean Vaughan gathered from far and wide to form his faculty in the closing years of the nineteenth century. In Abel, Vaughan had the founder of the first department primarily for the teaching of pharmacology in this country. In him also he had a powerful supporter of his efforts to reorganize the Department of Medicine and Surgery upon a true University basis. This support was not confined to routine teaching and research activities, but was extended outside the lecture room to the Journal Club, the Scientific Club, and to medical men engaged in active practice.

After Abel's resignation Dean Vaughan appealed again to Schmiedeberg, the professor of pharmacology at Strassburg, to send him a man to succeed Abel. Schmiedeberg recommended for the position one of his assistants, Arthur Robertson Cushny (A.M. Aberdeen '86, M. Surg. *ibid.* '89, M.D. *ibid.* '92, LL.D. Michigan '25). After his graduation from the University of Aberdeen he had been given a University fellowship to work with the physiologist Kronecker at Bern, and upon the completion of this year's work, went to Strassburg, where he spent two years studying with Schmiedeberg.

Cushny came to the University in the

fall of 1893 and remained here until, in 1905, he was called to University College, London, to organize the teaching of pharmacology in that institution.

Pharmacology at that time was a course given to the medical students in their junior year and consisted of daily lectures and demonstrations. Once a week the class was divided into two quiz sections, one being taken by Cushny and the other by his assistant. No laboratory course was required of the students, but early in his sojourn here Cushny, feeling the need of such instruction, developed a course which he offered to the students as optional work. This course was gradually developed as time went on and formed the basis of the laboratory course as it is now given. This was made a required part of the work shortly before Cushny went back to England.

The directions for the work in the optional course were given on mimeographed sheets. When the laboratory course was made a requirement for all the students these notes were given a temporary binding, each student securing his own copy. When Cushny decided to return to England the question was raised as to what would be the fate of these notes. It was possible that a new man might develop his own course; thus the outline which had been developed through the twelve years of the Cushny regime might be lost. It seemed wise, therefore, to put the material into permanent form, and this was accomplished by Cushny and his assistant. The first edition of the resulting volume, *A Laboratory Guide in Experimental Pharmacology*, by Edmunds and Cushny, was published by George Wahr, of Ann Arbor, in 1905. The guide has been revised and enlarged from time to time, but the name of Cushny still appears upon the title page.

The textbook problem was not confined to the laboratory course, for in 1893 there was not a single textbook on phar-

macology in the English language which was suitable for medical students. The standard textbook on pharmacology in Europe was Schmiedeberg's *Grundriss der Pharmakologie*. Cushny felt the great need of a book of this character and accordingly set himself the task of writing one. The work had to be done mainly in the evenings, and the labor involved may be judged by the fact that it was all written in longhand, for Cushny did not use a typewriter. The first edition of *A Textbook of Pharmacology and Therapeutics* contains 730 pages. He took seven years to write it. The book set a high standard not only from the scientific standpoint but from the literary viewpoint as well. The first edition, appearing in 1899, was followed at intervals of about three years by revisions made necessary by the new developments in the subject, so that when Cushny died early in 1926 the book was in the eighth revision and was one of the standard works on pharmacology used by students in medical schools throughout America and Great Britain. Since Cushny's death this textbook has, as occasion demanded, undergone several revisions at the hands of J. A. Gunn, of the University of Oxford, and C. W. Edmunds, of the University of Michigan.

Cushny's devotion to research work yielded rich results during his years of residence in Ann Arbor and added greatly to his own reputation and to the prestige of the University. The scope of his studies is indicated by the bibliography of his Ann Arbor years. It is both interesting and profitable, however, to mention somewhat more in detail certain of his studies which attracted wide attention.

His monograph on the action of digitalis on the mammalian heart was a contribution of first importance. About the same time, in the late nineties, he published the results of his studies upon

the irregularities of the heart. This paper recounted the results of what was without doubt the most important special study of cardiac irregularities which had appeared in America to that time. It was very largely his experience in making the study which enabled him in 1902 to make a diagnosis of "auricular fibrillation" in the case of a hospital patient who was exhibiting marked paroxysmal irregularity. This suggestion, upon being transmitted later to Dr. Mackenzie and to Sir Thomas Lewis, led to the establishment of this cardiac disorder as a clinical entity.

Equally important was Cushny's study of kidney physiology. His work in this field was really the beginning of the modern approach to this topic and did much to bring once more into the foreground the almost neglected Ludwig theory of the mechanism of urinary secretion. The study may perhaps be said to have culminated in his monograph entitled *The Secretion of the Urine* (1917; 2d ed., 1926).

Another field in which Cushny made a notable contribution was that of investigation of the action of optical isomers. The study, in which the effect of the optical activity of a substance upon its action in the body was investigated, is generally considered to be one of his most important contributions to medical science, ranking with his exhaustive studies on the action of the digitalis glucosides. The results of his studies upon the action of optical isomers were incorporated in his Dohme memorial lectures, given at Johns Hopkins University. They later appeared in book form, entitled *Biological Relations of Optically Isomeric Substances*.

In addition to the three major studies Cushny entered upon a number of other fields during his twelve years in Ann Arbor. A word should be added as to his relation to the important subject of the

biological assay of drugs, which has attained such widespread importance in the past thirty years. It was Cushny who first suggested making use of animals to test the relative activity of different preparations of the same drug. This method of testing had special application in the case of digitalis. The wide differences in the activity of various preparations of this drug were well recognized, but no way was known of avoiding them, because of the nature of the active principles of the drug. One of Cushny's assistants, Dr. Elijah M. Houghton (Ph.C. '93, '94m) was studying the problem, trying to devise some chemical method of standardization, but without success. Cushny suggested to Houghton that he might study the relative effect of different preparations of digitalis upon frogs and learn whether it might not be possible to utilize these animals for his purpose. The trial was successful, and in the late nineties the method was introduced into commercial practice. Since then the principle has been gradually extended to other drugs, so that now many drugs such as ergot, pituitary, and epinephrine preparations are assayed by biological means. The method was first introduced into the *United States Pharmacopoeia* in 1915 and has now been incorporated into the British *Pharmacopoeia* as well as into the pharmacopoeias of some other countries. It is not generally known that Cushny was the father of the idea.

An additional word should perhaps be given regarding Cushny's teaching. His daily lectures, interspersed with demonstrations, were models of a clear, concise presentation of his subject. Although he was a large, well-built man, he always spoke in a low tone so that during his lectures the amphitheater was absolutely quiet in order that none might miss what he was saying. His optional laboratory course was without doubt the first course

of its kind given in this country. First offered in 1903-4, it probably was not the first such course required in this country, for Professor Charles W. Greene claims that honor for the University of Missouri.

In 1925, after an absence of twenty years, Cushny returned to Ann Arbor at the invitation of the University to receive the honorary degree of doctor of laws. He maintained that these few weeks in Ann Arbor were the happiest of his life. Early the following year, at his new home in Edinburgh, where he had moved in 1918, he had a stroke and died a few hours later on February 25, 1926, at the age of sixty.

The Medical School and, in particular, the Department of Materia Medica and Therapeutics, owe a great debt to Abel and Cushny, and also to Dean Vaughan, who was responsible for bringing them to Ann Arbor. The wisdom of Vaughan's choice is shown by the subsequent careers of both men. During the sixteen years of their connection with the school they put the study of pharmacology upon such a firm foundation that its position in the Medical School has never been questioned. Because of the favorable beginning of the Department of Materia Medica and Therapeutics the successor to these two men has never had to fight for his academic life, as have heads of similar departments in certain other schools, where a new subject such as pharmacology has had a very strenuous fight for existence.

When Cushny left for London during the spring vacation of 1905 Charles Wallis Edmunds ('04, '01*m*), who was then Instructor in the department, was asked by the Dean to carry on the work of the department until the end of the year. Horace John Howk ('07*m*), of Rochester, New York, one of the medical students, was appointed to assist in the teaching.

At the end of the year the Regents,

upon recommendation of President Angell and the medical faculty, appointed Edmunds head of the Department of Materia Medica and Therapeutics, with the title of Lecturer on Materia Medica and Therapeutics—the same title which had been given Abel in 1890. Two years later, in 1907, Edmunds was appointed Professor of Materia Medica and Therapeutics. In later years the phrase "Director of the Pharmacological Laboratories" was added to the title; this was changed in 1937 to Chairman of the Department of Materia Medica.

Following his appointment in the early summer of 1905 Edmunds left at once for Europe, and, after stopping to see Cushny in London, went on to Heidelberg, where Professors Gottlieb and Magnus were teaching pharmacology, and studied during the summer. Returning to Ann Arbor in the fall Edmunds took up the work of the department. He was assisted by Dr. William Worth Hale ('08, '04*m*), who remained in the department for three years. Hale went to the hygienic laboratory of the Public Health Service at Washington, as assistant pharmacologist in 1908, and in 1913 to Harvard Medical School as assistant professor of pharmacology. In Cambridge he was associated with Professor Reid Hunt, who had left the hygienic laboratory at Washington at the same time, to take the headship of the Harvard Department of Pharmacology. Hale was appointed associate professor and assistant dean of the Harvard Medical School in 1918.

During the three years of Edmunds' association with Hale (1905-8), the general plan of the teaching of pharmacology was not changed essentially from that adopted by Cushny—lectures by the head of the department and weekly quizzes to the class, in two sections. The laboratory course was also given to the sophomore students, the

class being divided into sections. The space in the old Medical Building reserved for the teaching of pharmacology remained the same during those years. The room under the amphitheater on the first floor (originally occupied by Abel and Cushny) was given to the assistant as an office, and all of the second floor of the main part of the building was devoted to pharmacology. The entire north side of this part of the building, comprised of two long, narrow rooms, was devoted to the laboratory course. On the south side of the east-west hall were three rooms, the largest of which, toward the east end of the building, was used for a private research room. The small, intermediate room was occasionally used for research, and the small room at the rear served as an office for the head of the department.

In 1910 a change in the departmental quarters was necessitated by the fear that the old Medical Building, in which the department had been housed for so many years, might not be entirely safe for class purposes. The old Chemical Building to the west of the Medical Building had been vacated recently by the chemists; the north section of it was therefore turned over to the departments of Physiology and of Materia Medica and Therapeutics, and extensive changes were made to render it fit for use. These changes included the building of an amphitheater in the east end of the old building, the construction of suitable animal quarters on the top floor, and minor alterations throughout. As soon as these were completed Dr. Lombard took the second and part of the third floor for the Department of Physiology, and the first floor and part of the basement were assigned to the teaching of pharmacology.

Immediately after World War I the classes became too large for the amphitheater, and the laboratory was greatly

overcrowded. A floor was built between the two stories where the amphitheater had been, and the new space then available was appropriated for additional laboratory facilities. When the East Medical Building was finished in the mid-twenties the Department of Physiology moved out of the old Chemistry Building (Pharmacology Building) and the Department of Materia Medica and Therapeutics has since occupied the entire north wing, except for the laboratory on the east end of the second floor. A part of the rear was the first building erected by a University as a chemical laboratory in the United States. The front, or west, part of the building was erected in 1889, while Albert B. Prescott was Professor of Chemistry and Dean of the College of Pharmacy. The office occupied by the Professor of Materia Medica has served as an office for Prescott, for Professor E. D. Campbell, Director of the Chemical Laboratory, and also for Dean Julius O. Schlotterbeck and Dean A. B. Stevens of the College of Pharmacy.

Throughout these and the succeeding years, all the time of both the professor and the instructors which could be spared from teaching has been devoted to research problems, the scope of which is indicated in the bibliographies published by the University. Edmunds went abroad again in 1907, worked with Cushny in University College, London, and joined the English group of scientists who attended the International Congress of Physiologists in Heidelberg. He spent the summers of 1908 and 1909 in the hygienic laboratory at Washington, on problems concerning the biological assay of digitalis and ergot. His work on ergot, in the summer of 1909, was carried out in collaboration with William Worth Hale, who had joined the government service in the previous year. Edmunds' connection with the hygienic laboratory at Washington was very important, for it

led to a close collaboration between the laboratory at Ann Arbor and various national organizations, which has been of great value to the laboratory at Ann Arbor.

Because of his previous work on the biological assay of drugs Edmunds was asked to assume the chairmanship of a committee to make recommendations regarding the desirability of introducing such methods into the *United States Pharmacopoeia*, which was then undergoing revision (1910-20). As a result of these studies biological assays of certain drugs were introduced in Volume IX of the *United States Pharmacopoeia*, which was the first pharmacopoeia in the world to make such methods of assay obligatory. This led to a continuation of the University's connection with the *Pharmacopoeia* and resulted in close cooperation between the Ann Arbor pharmacological group, the National Institute of Health, and the Food and Drug Administration at Washington. The laboratory group has furnished expert advice to the Federal Government from time to time through the years, and this led to the appointment of Dr. Erwin E. Nelson (Missouri '14, Ph.D. *ibid.* '20, Michigan '26m) of the Department of Materia Medica and Therapeutics, first as a special expert upon certain biological problems and finally as head of the Division of Pharmacology in the Food and Drug Administration of the Department of Agriculture. This position Nelson held for nearly two years, having obtained leave from the University for that purpose. Then, too, the laboratory has maintained a valuable connection with the American Medical Association through membership in the Council of Chemistry and Pharmacy. This council, in which Edmunds has held membership since 1921, exercises a certain control over the introduction into medical practice of the

newer drugs of the more effective type. This control consists in ascertaining the exact nature of the drug, in regulating its potency and purity, and in supervising the advertising literature so as to exclude false claims for curative properties. The activities of the council have exerted a tremendous influence upon medical practice, and especially upon therapeutic practice, during the thirty-five years of its existence.

Edmunds has been chairman of the committee of the Council of the American Medical Association on grants to support research on problems connected with therapeutics. He has also been chairman of the Pharmacopoeial Advisory Board on Antianemic Preparations—a committee which has control over the potency claims which are made for all official liver and stomach preparations used for the treatment of primary anemia.

These and other connections of the department have proved to be of great value to the laboratory as a means of keeping the staff in close contact with outside movements and with the newer introductions into the field of therapeutics.

Dr. Hale was followed as Instructor by Dr. George Byron Roth ('06, '09m), who remained at the University in the Department of Materia Medica and Therapeutics for four years (1909-13). Then he, too, joined the pharmacological group at the hygienic laboratory at Washington. He was made professor of pharmacology at George Washington University in 1924.

Roth was succeeded by Dr. Maurice Isadore Smith (College of the City of New York '09, M.D. Cornell '13), who served as Instructor in Pharmacology from 1914 to 1917, when he resigned in order to accept the professorship of pharmacology in the University of Nebraska. He later became the senior and principal pharmacologist in the National Institute of Health at Washington.

In 1919 Nelson was appointed Assistant Professor of Pharmacology. He became Professor of Pharmacology in 1936. During a part of his career in Ann Arbor he acted as a consultant to the Food and Drug Administration at Washington. Nelson resigned from the University in 1937 to become professor of pharmacology at Tulane University Medical School.

Ralph Grafton Smith (Toronto '21, M.D. *ibid.* '25, Ph.D. Chicago '28) was appointed Instructor in Pharmacology in 1928 and advanced to a full professorship in 1937. Jacob Sacks (Chicago '22, Ph.D. Illinois '26, M.D. Northwestern '31) was appointed Instructor in Pharmacology in the department in 1932 and became Assistant Professor in 1937. John Howard Ferguson (Capetown '21, A.M. Oxford '31, M.D. Harvard '28) was appointed Assistant Professor in 1937.

In addition, the following taught in the department for short periods: Dr. Allan L. Richardson ('08, '10m), Demonstrator of Anesthesia, 1912; John G. Gage ('08m), 1916-17; Alvah R. McLaughlin ('09 Lafayette, M.A. Princeton '14), 1923-25; Albert G. Young (Ph.D. Wisconsin '24, M.D. Harvard '28), 1925-28; Helen Bourquin (Colorado '15, Ph.D. Chicago '21), 1928-31; and Dr. A. R. McIntyre, 1931-32. Also, as assistants and fellows many advanced medical students have been employed in the laboratory.

In 1912 the Department of Anesthesia in the University Hospital was placed, for convenience of administration, under the Department of Materia Medica and Therapeutics. Dr. Richardson was Demonstrator of Anesthesia for the first year. After his resignation, Mrs. Laura Davis-Dunstone (R.N. '08) was placed in charge and held the position first as Demonstrator and later as Instructor. About 1930 the Department of Anes-

thesia was transferred to the Department of Surgery.

In 1910 the course Practical Therapeutics was instituted for the senior students. Dr. Mark Marshall (Earlham '02, Michigan '05, '08m) was appointed Instructor in Therapeutics and retained the position from 1910 to 1920. During the years, the teaching hours have been changed somewhat to make them conform to the changing requirements of the medical curriculum. The lecture course was cut from five hours a week to four, and then, in order to lighten the students' load, to three hours a week for a year. This was made possible by the placing of a greater emphasis upon the laboratory course. The position of the lecture course within the medical curriculum was also changed, in that it was moved from the two semesters of the junior year to the second semester of the sophomore year and the first semester of the junior year. In 1940 the time allotted to pharmacology was ninety-six hours of lecture and ninety-six hours of laboratory work.

RESEARCH.—In addition to studies which have been made for the trustees of the *United States Pharmacopoeia*, "A Study of Strophanthins" and "The Potency of the U.S.P. Standard Digitalis Powder," two problems have been attacked in a comprehensive manner. The first of these is the study of drug addiction. In 1929 the National Research Council was given a sum of money to study the opium problem. The drug-addiction committee of the council decided to make a study of morphine and allied natural and synthetic alkaloids, patterning the work somewhat after the study which has led to the introduction of novocaine (procaine) as a nonhabit-forming substitute for cocaine. In accordance with this plan, a chemical laboratory for the synthesis of the compounds was organized at the University of Virginia, and

the invitation of the University of Michigan to have the study of the action of the compounds conducted here was accepted by the committee. Accordingly, in 1930, the work was started. Edmunds was fortunate in being able to secure Dr. Nathan Browne Eddy (M.D. Cornell '11), professor of pharmacology in the University of Alberta, to conduct the work. The study extended over a period of ten years, that is, until the summer of 1940, when the Federal Government assumed responsibility for it and transferred the unit to the National Institute of Health at Washington. During this period Eddy was assisted by Hugo Martin Krueger (Denver '24, Ph.D. Michigan '30), Margaret Sumwalt (Goucher '23, B.S. Washington University '25, Ph.D. Pennsylvania '29), Charles Ingham Wright (Middlebury '26, Ph.D. Rochester '32), Robert H. K. Foster (Ohio State '23, Ph.D. Chicago '32), and a group of assistants. The work assumed extensive proportions. Some three hundred and fifty compounds were studied, and the most desirable of these, from the standpoint of lack of toxicity and of therapeutic efficiency, were selected for trial upon the human patient. This portion of the study was sponsored largely by the United States Public Health Service, by certain hospitals under the control of some of the state health departments, and by certain general hospitals, including the University Hospital at Ann Arbor. The results of the studies which were carried out in the Department of Materia Medica and Therapeutics of the University have been published in about one hundred ar-

ticles which have appeared in various medical journals, chiefly in the *Journal of Pharmacology and Experimental Therapeutics*. One monograph, edited largely by Eddy and entitled "Studies on Drug Addiction," was published by the Public Health Service in 1938. An extensive review of the literature of the "Pharmacology of the Opium Alkaloids," edited by Eddy, Krueger, and Sumwalt, was also prepared. The work which has been done by this group headed by Eddy has been of outstanding importance. It attracted wide attention, and, though it is unfortunate that it has been removed from Ann Arbor, it is gratifying that it has been taken over by the government.

The second extensive research problem was financed by the Kellogg Company of Battle Creek and was concerned with the relative effects of caffeine, coffee, and decaffeinated coffee. Katherine Horst (Iowa State College '17, Ph.D. Yale '31) was secured to supervise the study and she continued this work for about four years, until her unfortunate death in 1934. This work, in which Dr. Horst was assisted by medical students, was carried out upon human subjects, and the findings were published in the *Journal of Pharmacology and Experimental Therapeutics*.

It is hoped that the spirit of Abel and of Cushny has not departed from the department which they founded and where they carried on researches which added so much to the reputation of the Medical School and of the University.

CHARLES W. EDMUNDS*

* Died March 1, 1941.

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THE DEPARTMENT OF NEUROLOGY

THE teaching of neurology in the Medical School began in 1888-89, when Dr. William James Herdman ('72, '75m, LL.D. Nashville '97) was named Professor of Practical Anatomy and Diseases of the Nervous System. The change of his title to Professor of Diseases of the Mind and Nervous System and of Electrotherapeutics in the following year apparently marked the removal of the subject from the Department of Anatomy and the creation of a new department.

Herdman had a large general and consultation practice. He saw patients at the Hospital, but the teaching of neurology was largely confined to the weekly clinic held each Wednesday afternoon. At this clinic and in the examination and care of the Hospital patients he was assisted by Dr. Jeanne Cady Solis ('92m), Demonstrator of Nervous Diseases. He was greatly interested in electrotherapeutics, and the medical students were taught the subject thoroughly, both by laboratory work and by the treatment of patients. His interest in electricity led to the development of the use of X rays at the Hospital, and for some time roentgenology was taught in the Department of Neurology.

In the nineties he conceived the idea of the establishment of the State Psychopathic Hospital in Ann Arbor. After some delay he persuaded the state legislature to pass the required bill and appropriation, and the building was ready for occupancy in 1906. He was then Professor of Nervous and Mental Diseases. Albert Moore Barrett (Iowa '93, M.D. *ibid.* '95), who had been at the Danvers State Hospital, Massachusetts, was appointed Associate Professor of Neuro-

pathology and Director of the Psychopathic Hospital.

In December, 1906, Herdman died and Barrett was appointed Professor of Psychiatry and Diseases of the Nervous System. As Barrett was interested only in psychiatry, Carl Dudley Camp (M.D. Pennsylvania '02), who had been instructor in neurology at the University of Pennsylvania, was appointed Clinical Professor of the Diseases of the Nervous System in June, 1907. At this time the department's functions in neurology and in psychiatry were separated, both as to teaching and as to the care of patients. Dr. Solis resigned her position at this time, and Dr. Theophil Klingmann ('90p, '92m) served as Demonstrator of Diseases of the Nervous System until 1917. The Department of Diseases of the Mind and Nervous System remained one administrative unit until March, 1920, when the Board of Regents divided it into two departments and changed the title of Barrett to Professor of Psychiatry and that of Camp to Professor of Neurology.

The number of teaching hours devoted to neurology was increased in 1907. The Wednesday afternoon clinics were continued, but the clinical period was lengthened. In the second semester an introductory lecture course was given to the juniors, and ward-class instruction to groups of senior students was begun.

The junior students received a course of forty-eight lectures, which covered the subject generally and which were illustrated by case presentations and specimens. A clinic for the seniors was held once a week throughout the year. This was scheduled for only one and one-half hours, but, as all the patients were shown

it frequently lasted three or four hours. The seniors also received sixteen hours of ward-class instruction in sections of a quarter of the class. In these smaller groups they were taught the method of examining patients. Since 1929 the senior clinic has been limited to one hour and has been given in the second semester only, but the plan of teaching has remained otherwise unchanged.

At first the department had no graduate intern; a senior student lived in the Hospital and served in that capacity. In 1915 a graduate resident was appointed, and the following year, an instructor. When the new Hospital was opened the increased number of patients to be cared for called for an increase in staff, and an additional instructor was appointed. Raymond Walter Waggoner ('24m, Sc.D. Pennsylvania '30) came as Assistant Professor of Neurology in 1929, on the resignation of John Louis Garvey ('20m), who since his appointment to an instructorship in 1924 had been advanced to an associate professorship. Waggoner resigned in 1937 to take Barrett's place as Professor of Psychiatry and was succeeded by Russell DeJong ('29, '36m).

In 1940 the staff consisted of a professor, an assistant professor, three instructors, an assistant resident in neurology, and one intern. The instructors usually serve for a period of two years.

The most important activity of the department in its graduate program has been the rotation of staff members. Each year a member of the graduating class is selected as a rotating intern, to serve one year in various other departments in the Hospital. The following year, if his work is satisfactory, he becomes assistant resident in neurology. He then serves one year as junior instructor and another as senior instructor. During these two years he has time and opportunity to do work in neuroanatomy and neuropathology and may also spend three months in residence in the State Psychopathic Hospital (now Neuropsychiatric Institute). This training has been accepted as qualifying the candidate for recognition as a neuropsychiatrist.

From time to time medical graduates apply for instruction in neurology. Special courses are arranged for such men, although no certificate is given. During World War I the Surgeon General's Office assigned certain medical officers to receive instruction in neurology here.

The Department of Neurology offers courses for credit in the Department of Postgraduate Medicine. Members of the staff lecture frequently before county medical societies and participate in the program of graduate medical instruction sponsored by the Michigan State Medical Society.

CARL D. CAMP

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THE DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

WHEN the Department of Medicine and Surgery was established in 1850, two outstanding scientific men were members of its faculty—Silas Hamilton Douglass¹ (A.M. hon. Vermont '47) and Abram Sager (Rensselaer Polytechnic Institute '31, M.D. Castleton Medical College '35, A.M. hon. Michigan '52). With the aid of Regent Zina Pitcher, one of the most widely known physicians in the state, they had organized the department. In 1851, his last year as Regent, Pitcher was appointed Emeritus Professor of the Institutes of Medicine and Obstetrics. The position was purely honorary, however, and his appointment to it was apparently the University's only record of any special interest he may have had in the teaching of obstetrics.

Sager was appointed Professor of the Theory and Practice of Medicine in January, 1848, with the understanding that he would also teach pharmacy and medical jurisprudence. By his own choice, in 1854, he was transferred to be Professor of Obstetrics and Physiology. Although there were discrepancies between the titles and duties of the other four medical professors, Sager's title corresponded with his teaching responsibilities.

Jonathan Adams Allen (Middlebury '45, M.D. Castleton Medical College '46), who had previously taught physiology, left the University in 1854, and Alonzo Benjamin Palmer (M.D. College of Physicians and Surgeons [N.Y.] '39, A.M. hon. Nashville '55, LL.D. Michigan '81) was appointed Professor

of Materia Medica and of the Diseases of Women and Children.

While in charge of the teaching of gynecology, Palmer was closely associated with Zina Pitcher in efforts to improve medical education. From 1854 to 1858 Palmer was an editor of the *Peninsular Journal of Medicine*, of which, during about one-half of that time, Pitcher was the chief editor; and in the summers of 1857 and 1858 Palmer gave clinical lectures and bedside demonstrations before the University's clinical classes in Detroit, which also were under Pitcher's direction. In these classes a few normal and abnormal obstetrical cases were presented. Both men advocated the inclusion of adequate hospital training in the work required for the medical degree, but unlike Pitcher, Palmer at that time favored a plan—advanced by Professor Moses Gunn and emphatically rejected by the Regents in 1858—to move the entire Medical Department to Detroit.

In 1860, when Palmer was placed in charge of the instruction in medicine and pathology, Sager was relieved of his work in physiology and resumed the teaching of women's and children's diseases. The six-year period which then ended was the only time in the history of the school when gynecology and obstetrics were not taught in the same department.

One student has said that Sager, in lecturing, was inclined to become absorbed in general biology rather than the neglect of obstetrics, but from all accounts he was a conscientious, if not an eloquent, lecturer. By 1871-72 throughout the six-month session he was giving

¹ Spelled "Douglass" after 1873.

eight lectures a week, including those in obstetrics, gynecology, and pediatrics.²

Though a little clinical instruction in medicine and surgery was regularly provided throughout Sager's period of service, first by means of free clinics before the students and later in the wards of the Hospital, clinical obstetrics in the University was practically nonexistent, and gynecology also was taught largely by means of lecture and recitation. Ordinarily, neither Sager nor his successor performed more than the most minor operations; major surgery in this field, such as the removal of ovarian cysts, was the province of the professor of surgery. For nearly forty years medical students at the University of Michigan were graduated without having been required to witness a case of labor or a childbirth. Some ambitious and wide-awake students witnessed a few cases in the practice of their preceptors, but such instances were exceptional, for women naturally disliked having the students present, and it is to be doubted that even these students learned much about practical obstetrics, for at that period obstetrical manipulations were conducted under the sheet.

The Hospital was opened in 1869. The financial principle on which it was established, namely, that it should be wholly self-supporting, explains why the obstetrical material did not increase much for another twenty years, for, no matter how small the charge—and at first it included only food and medicines—women would not pay to be delivered by medical students, and the Michigan state laws authorizing the use of public moneys for the maintenance and transportation of those unable to pay had not yet been enacted.

² This term (in the rather unrecognizable form of "Paediatrics") appeared for perhaps the first time in University records in the 1871-72 report of the medical faculty (*R.P.*, 1870-76, p. 206). The term was not in ordinary usage until about twenty-five years later.

In fact, it was just as well in the days before antiseptics that the University could do so little work in clinical obstetrics, for at least one-half of the women confined in hospitals, such as Bellevue in New York City, died of puerperal sepsis. Although Semmelweis in 1847 had proved conclusively that childbirth fever was transmitted by the contaminated hands of medical students, the medical profession as a whole either was ignorant of the fact or denied its truth. Scientific information spread slowly between 1850 and 1890.

In Sager's time surgery at the University was performed under great difficulties. In those days neglect of ordinary cleanliness before and during operations was not recognized as the cause of the many postoperative fatalities, but because of the risk, major operations were avoided whenever possible. After 1869 some operations were performed at the Hospital "upon patients that could not be brought before the class" in the presence of a few specially interested students (*R.P.*, 1870-76, p. 207). Many of the surgical patients were carried across the campus to an upper lecture room of the Medical Building and were operated on while lying on a table upon which, perhaps the hour before, the professor of anatomy had demonstrated on a cadaver.

It was under such circumstances that Sager performed a Caesarean section on a rachitic dwarf—one of the first, if not the first, of such operations in Michigan (*Univ. Mich. Med. Journ.*, 2 [1871]: 385-93). It is not to be wondered at that the patient died of peritonitis soon after the operation. Sager's description of the operation, in which he was assisted by Professor Corydon L. Ford and George E. Frothingham, Demonstrator of Anatomy, is of particular interest. Because he thought it his duty, this modest little man, who probably had had very little experience as a surgeon, performed an

operation almost without parallel in this section of the country. Thirteen years earlier such a procedure was advocated by Säger. The uterine wound was sutured to avoid spill from the interior of the uterus and subsequent infection. Dr. Sager secured the pelvis and gave exact measurements to show why birth through the natural passages was impossible. The report of the case is impressive for its demonstration of the scientific mind of that period.

Sager's teaching career ended in 1873. At that time he obtained a leave of absence because of ill-health, and in his place Dr. Edward S. Dunster was appointed Lecturer in Obstetrics and Diseases of Women and Children. In March of the following year, Sager resigned his chair and was made Professor Emeritus, but, at the request of the faculty, he retained the deanship, which he had held since 1868. The admiration with which his colleagues and the University officials regarded him was expressed in the following resolutions adopted by the Regents in March, 1874:

Resolved, That we hold Prof. Sager in the highest esteem, not only for the symmetry of his character and purity of his life, but also for the eminent services which he has rendered to this University during a period of thirty-two years.

Resolved, That the great success attending the Medical Department has been largely due to his loyalty, industry, wisdom and scholarship. (*R.P.*, 1870-76, p. 334.)

Sager resigned the deanship in 1875 as a protest against the University policy of requiring certain of the "regular" medical professors to receive students of the new Homeopathic Medical College into their courses. He died in Ann Arbor, August 6, 1877.

Edward Swift Dunster (Harvard '56, A.M. *ibid.* '59, M.D. New York College of Medicine and Surgery '59, M.D. hon. Dartmouth '81), a direct descendant of

Henry Dunster, the first president of Harvard College, was appointed Professor of Obstetrics and Diseases of Women and Children in 1874. He had served through the Civil War and until 1868 as assistant surgeon in the United States Army. From 1868 to 1871 he had been professor of obstetrics and of the diseases of women and children in the University of Vermont and also editor of the *New York Medical Journal*, and from 1869 to 1874 he served on the faculty of the Long Island College Hospital as lecturer on the subjects of obstetrics and the diseases of women and children. In 1871 he became professor of obstetrics at Dartmouth College and continued to lecture there during the summer months until his death. Holding chairs in two separate institutions at once, as he did from 1869 to 1871 and again in 1873-74, was a practice typical of the times, made possible by short annual sessions and an almost total lack of clinical teaching.

Dunster was in many ways a brilliant man and was acknowledged to be the most logical, eloquent, and interesting lecturer that the Department of Medicine and Surgery had ever had. To quote the words of his pupil, assistant, and successor, James Nelson Martin (Hillsdale '80, Ph.M. *ibid.* '83, Michigan '83m):

Last but not least, in the lecture room or editor's chair, was our scholarly Dunster. It is no disparagement to the others of that faculty to say that he was the most brilliant lecturer and writer among them all. Everyone enjoys a logical presentation of the subject, and no one left Doctor Dunster's classroom or read his articles, without a clear conception of the subject under discussion. Listening to him gave pleasure like that derived from the study of a fine painting. His language was almost perfect, his diction polished, and his argument clear and convincing . . . His students love to remember him in the lecture room. (*Physician and Surgeon*, 27 [1905]: 152-53.)

For nearly three years the Regents had been considering plans for a large hospital, to be donated by the state and operated by the University. Such an institution, it was suggested, might have been (1) entirely an alms hospital for county patients, or (2) a treatment center where victims of diseases which were hard to treat might receive effective care, whether they were public patients or not, or (3) an alms hospital for the invalid poor which would also serve as a special treatment center for the general public (*R.P.*, 1870-76, cf. pp. 189 and 202). Gynecological surgery was mentioned in particular in this connection, though with the indirectness customary in references to such matters at that time, as a specialty greatly needing attention and development for the relief of unnecessary suffering among all economic classes. The Regents' "committee on state hospitals" went so far as to report that very few doctors in Michigan or near-by states had the requisite skills and the costly apparatus needed for the proper treatment of certain difficult cases; moreover, that at no hospital west of the eastern seaboard could such treatment be secured; and that, in consequence, even the well-to-do delayed proper care because of the inconvenience involved, while the poor usually went without treatment altogether. Because it seemed inexpedient at the time to ask the state for such a large sum as would have been required for such a hospital as was desired, that project was temporarily abandoned in December, 1872.

In 1875-76 the original campus Hospital was remodeled, and a long annex at the rear of it, designed on the pavilion plan, was erected. This sixty-bed Hospital, mostly new, was financed largely by the state and was called a state hospital; it differed from the state hospital envisioned in the early seventies, however, not only in size, but also in other impor-

tant respects, as the state made no legal provision for the transportation and living expenses of public patients.

A clinical lecture room, originally specified to be included in the new Hospital (*R.P.*, 1870-76, p. 435), was built only after additional state funds were granted in 1879, but a lengthened course, which was intended to include much more clinical work than had been given, was introduced as an option in 1876, and by 1880 all beginning students were required to take the new three-year course, and the school year had been lengthened to nine months.

Dunster's work in the long curriculum was concentrated in the senior year. In 1881 his theoretical work in obstetrics, consisting of a one-semester course of sixty lectures, was offered both semesters of the second year. His lecture course in the diseases of women and children, consisting of forty-five lectures, also given in both semesters, remained in the third year, and the seniors also met in the amphitheater twice a week throughout the year for his course called Clinical Gynecology and Diseases of Children.

The better facilities of the Pavilion Hospital, opened in 1876, gave an impetus to the clinical work in surgery, medicine, and ophthalmology, but had practically no effect on clinical work in obstetrics, and even in gynecology the cases were pitifully meager—three in 1877, seventeen in 1878, and eleven in 1879. In spite of this, when the titles of the heads of the other clinical departments were changed in 1880, to signalize the improvement in clinical instruction expected as a result of the acquisition of the Hospital amphitheater, Dunster's title was altered to Professor of Obstetrics and of the Diseases of Women and Children and of Clinical Gynecology. The lack of any reference to clinical obstetrics in his new title was significant. In presenting a request for an obstetrical

manikin in 1879—apparently the first one purchased in nearly thirty years of obstetrical teaching at the University—he had stated that the need of it was particularly urgent in obstetrics, because, “from our position, we are unable to have clinics” (*R.P.*, 1876–80, p. 391).

An obstetrical clinic might have been maintained just as the physics and chemistry laboratories were maintained, or the practice of sending welfare cases at local or state expense might have been stimulated by legislation. The first law under which public patients were sent to the University Hospital was a children’s hospitalization law, requested by the officials of the State Public School at Coldwater in 1878 and passed by the legislature in 1881. In his annual reports for both of those years, President Angell suggested that a similar law for adult inmates of the county almshouses be passed. It was not readily perceived, however, that the enactment and observance of special laws might be necessary to guarantee the admission of a sufficient number and variety of cases for instruction, and his suggestion met with no response (see *HOSPITAL*, p. 975).

In February, 1888, a senior petition for a lying-in ward was received by the medical faculty and was referred to Dunster. He died in Ann Arbor on May 3, 1888, without having made any formal report on the subject, but the establishment of a small obstetrical ward within the Hospital and the launching of a vigorous local campaign, in that same year, for a separate maternity hospital appear to have been results of his efforts.

One mark of the students’ affection and respect for Dunster was a petition from the seniors, soon after his death, requesting the faculty to devise a way of affixing his signature to their diplomas. The faculty responded by asking the steward to have it electrotyped.

Immediately after the death of Dun-

ster, his assistant, Dr. James Nelson Martin, was placed in temporary charge of the chair of obstetrics and diseases of women and children, in accordance with a recommendation of the medical faculty. The Regents took their time in making a more permanent appointment. In December, 1888, they appointed Martin Acting Professor of Obstetrics and Diseases of Women and Children. He was reappointed in 1889. The faculty recommended in 1890 that he be appointed Professor of Obstetrics and Diseases of Women, but the Board renewed his acting professorship of all three subjects for a single year. He was finally appointed Professor of Obstetrics and Diseases of Women in March, 1891 (*R.P.*, 1886–91, p. 487), and thus pediatrics, previously always associated with gynecology, was formally removed from the department. A course in the diseases of children had been organized in 1889 and was continued through 1892. The transfer of instruction in that subject may have taken place about 1890, when Walter Shield Christopher (M.D. Medical College of Ohio [Cinn.] ’83), a distinguished pediatrician, was in charge of the Department of the Theory and Practice of Medicine. For some years after 1892 pediatrics was taught in connection with internal medicine. In the present century, until the establishment in 1921 of a separate Department of Pediatrics and Infectious Diseases, it was given increasing attention as a specialty within the Department of Internal Medicine. In the summer of 1888, Judge Harriman, E. B. Pond, A. W. Hamilton, and Otto Eberbach, a committee representing the citizens of Ann Arbor, came before the Board of Regents to discuss the possibility of establishing a local maternity hospital (*R.P.*, 1886–91, p. 239), and in the yearly *Announcement* published soon afterward (*Med. Ann.*, 1888–89, p. 21) it was stated that local citizens had “initi-

ated measures looking to the erection at an early day of a well equipped lying-in hospital," to be conducted by the faculty and to be utilized for clinical instruction. In October of that year, President Angell stated that it was most desirable to have a lying-in hospital (*R.P.*, 1886-91, p. 269). Then this particular project was dropped; it was never mentioned in the University *Calendar* nor in subsequent issues of the *Announcement*.

From the official records the reason for discontinuing the campaign is clear, even though there was no published explanation. The University was being severely criticized for the inadequacy of its hospital plant as a whole, and an organized effort was being made to have the clinical teaching done in Detroit. Ann Arbor would probably not have had a University Hospital at all, if quick action had not been taken to provide a new main building and better equipment. This was the basic clinical need, and the one with which the President was primarily concerned, even when he mentioned the special need of an obstetrical hospital. Moreover, the chance of obtaining enough money for an entirely new hospital plant depended chiefly on the size of the conditional pledge which the Regents could obtain from the townspeople before the state was asked for help. A citizens' committee estimated in December, 1888, that \$25,000 might be raised for the purpose in Ann Arbor (*R.P.*, 1886-91, p. 291), and fortified by this tentative promise the University obtained, under an act approved the following summer, a state gift of \$50,000 for the new hospital plant. To enlarge the city's contribution and thus ensure the construction of new main buildings for the University and Homeopathic hospitals, the citizens interested in founding a special maternity hospital undoubtedly agreed to postpone their own plans.

Before the fall of 1888, without awaiting the outcome of the campaign for a separate maternity hospital, the faculty established a small "lying-in ward," inside the old campus Hospital; and there, according to the *Announcement* of 1888-89, each senior was expected to attend several confinement cases—"when available"—as the corrected explanation read during the next two years, for practically no patients came. Adopting a practice which had proved successful under similar circumstances in the Homeopathic Hospital, the faculty of the Department of Medicine and Surgery therefore obtained a Regents' order authorizing the Hospital superintendent to find obstetrical patients who would consent to be used for instruction if the University paid their maintenance costs. For this purpose the Medical Department was granted a University subsidy of \$200 in each of the three years 1888, 1889, and 1890.

The first state law authorizing the care and treatment of indigent adult patients in the University and Homeopathic hospitals and the payment of their transportation and maintenance costs from public³ funds (*Public Acts*, No. 246, 1889) contained the provision:

Whenever obstetrical wards are established in said hospitals, the said [county] superintendents [of the poor] may make special contracts with the regents for the care and treatment of such obstetrical cases as are a public charge in their respective counties.

As the small obstetrical wards in the two campus hospitals were already in existence, what the writers of this part of the law had in mind was evidently the establishment of much more ample accommodations for obstetrical patients,

³ This law was similar to Act No. 267, 1915, in that it called for payment of such expenses from county, not state, funds.

such as the University would have had if the plan of 1888 for a special maternity hospital had materialized. Many patients were sent to the Hospital every year under other provisions of Act No. 246 of 1889, until a new hospitalization law (No. 267) for adults was enacted in 1915, but for some reason, even after separate buildings for maternity patients were occupied in 1906 and in 1908, the above-quoted section governing obstetrical cases was almost wholly inoperative.

With the exception of the course of sixty lectures in obstetrics, taken twice in the intermediate year of the curriculum, all of the work in the department under Dunster between 1881 and 1888 had been concentrated in the third, or senior, year. In the fall of 1888, after Martin was placed in temporary charge, a two-semester lecture course in gynecology and obstetrics was begun. Originally, it was taken in the second year and was repeated in the third, but in 1889-90 it was scheduled only for seniors. A separate, one-semester course in children's diseases, for second-year students, was begun in February, 1890.

When the four-year curriculum went into effect, in 1890-91, the clinical work in gynecology, as well as that in obstetrics, was taken only by seniors, but the general lecture course in these subjects, requiring two hours a week in the first semester and four hours a week in the second, was scheduled for both juniors and seniors. Diseases of Children, a first-semester course meeting two hours a week, was also taken twice. In 1892, after this separate course in children's diseases was discontinued, the junior-senior lecture course, Obstetrics and Gynecology, was scheduled for three hours a week throughout the year, and juniors as well as seniors came to the biweekly gynecological clinics. In the same year special junior drill courses in the clinical

subjects, with daily meetings for several weeks, were introduced. In the demonstration course in obstetrics and gynecology, the juniors were shown, by means of manikins and models,⁴ what to do in the various presentations and in emergencies that might occur in obstetrical practice (*Med. Ann.*, 1893-94, pp. 21-22).

According to a statement appearing in the *Announcement* of 1894-95 (p. 29) and in the following years, every senior had an opportunity to attend one or more obstetrical cases, since pregnant women were admitted several weeks before delivery and were kept for several weeks afterward, and each patient was assigned to a group of a few students, who were expected to make a study of her case throughout her stay at the Hospital. Through 1898, however, only eleven or twelve confinement cases a year were available. The difficulties of obtaining even these few is indicated by the fact that in 1897-98 the Board of Regents found it expedient to grant another subsidy (\$100) to "each of the hospitals . . . for the purpose of maintaining obstetrical cases" (*R.P.*, 1896-1901, p. 115).

Martin stated:

Most of the work in this department of diseases of women and obstetrics is done before sections of the class, that they may come in closer contact with the patients and observe more closely the pathological changes that have taken place, while the same are being considered. Also that they may observe more closely each step in the examination and treatment of the cases, and especially each step in the operation, and thus discover the cause of the trouble and the methods of relieving the same. (*Ann. Rept. Univ. Hosp.*, 1893-94, p. 18; *ibid.*, 1896-97, p. 25.)

⁴ An appropriation of \$375 for manikins—presumably obstetrical manikins—had been granted by the Board of Regents in 1889 (*R.P.*, 1886-91, p. 376).

According to an article in the *Physician and Surgeon* (11 [1889]: 415-18), there had been only ten obstetrical patients in the Hospital in 1888 and 1889 and not more than seventy gynecological patients, representing about ninety examples of gynecological disorders—for often, in this branch of medicine, several such conditions are present at once, and the number of cases, therefore, usually exceeds the number of patients. In 1892-93, however, there were about five hundred gynecological cases; in 1893-94, approximately eight hundred; and throughout the remainder of Martin's administration, six hundred to eight hundred a year. After the completion of the new Catherine Street Hospital late in 1891, there had been an increase in the number of cases in gynecology, as in nearly every other clinical branch of medicine excepting obstetrics, and the work of Martin's department had been further augmented in the early nineties (*Hosp. Rept.*, 1892-93, p. 15) by the transfer from the Department of Surgery of all surgery on the female pelvic organs. This was a great step forward, as far as the work in both obstetrics and gynecology was concerned, for previously there had been no opportunity for those who taught female pelvic and abdominal surgery to increase their knowledge of the subject. Martin was handicapped in his surgical work, however, for even the new Hospital was poorly constructed and was septic. The surgical ward was large and overcrowded, and students had free access to it. A Hospital rule in force since 1876 forbade the admission of patients known to have contagious diseases, but occasionally a patient contracted such a disease on the way to the Hospital or even after being admitted. Unfortunately, there was no separate building for these separate emergency cases until 1898-99, and contagious-disease epidemics were common.

Whenever such a disease as diphtheria, scarlet fever, or smallpox was discovered in a ward, the ward had to be quarantined and surgical work discontinued, or the lives of patients would have been seriously endangered.

The *Announcement* published a short time before October, 1894, contained the statement: "In the coming session . . . the seniors and juniors will have no didactic lectures in common, separate courses being given to each class." The lectures on obstetrics were then concentrated in the junior year, and the theoretical work in gynecology was given in the senior year. In 1894 the courses were further compressed, the theoretical work in obstetrics being given only for second-semester juniors and the general lectures in gynecology being given only for first-semester seniors. Throughout the early period juniors and seniors attended at least some of the clinical demonstrations in gynecology together, but the methods course preparatory to actual case work continued to be given in the junior year.

In 1894-95 each student was required to devote 382 hours to obstetrics and gynecology, in addition to the indefinite time needed for attending cases in the lying-in room (*Med. Ann.*, 1894-95, p. 32); 192 hours were spent at classroom lectures, 128 hours at "clinical lectures," 32 hours in recitations, and 30 hours in studying methods of diagnosis and the use of instruments. The required work remained essentially the same until 1900, except for the addition of a few hours for the study of diagnosis and of the use of instruments. In 1900-1901, Martin's general lecture courses, including recitations, required only sixty-four hours in the junior year and sixty-four hours in the senior year; the junior methods course, conducted by his assistant, required thirty-six hours; and the clinical work in gynecology, again scheduled for seniors only, required 180 hours in all.

The afternoon gynecological clinics were held, as before; in addition, since 1899, there had been several short morning clinics each week in gynecology.

Word came in the spring of 1898 that the University might receive, "subject to certain charges," the bulk of the estate of Dr. Elizabeth H. Bates, of Port Chester, New York, for a professorship to be "known and called the Bates Professorship of the Diseases of Women and Children," provided the University admitted women to its Medical Department and gave them the same educational advantages as it gave male students. President Angell estimated that the legacy would yield at least \$100,000. Within two years, however, the Bates property in the University's possession was worth more than \$133,000, and by 1940 the principal derived from it was valued at \$137,000.

President Angell wrote:

It does not appear that our benefactor ever visited the University. So far as we can learn, she was moved to remember us in this generous manner by the fact that this University was one of the first to offer medical education to women. She wished to testify her appreciation of the service thus rendered to her sex, and to enlarge our facilities for medical education. (*R.P.*, 1896-1901, p. 312.)

The Regents voted in May, 1898, to accept the gift and comply with the conditions laid down; in June they established the new professorship and gave the medical faculty the task of suggesting a suitable person to hold it. The old custom of combining the teaching of gynecology with that of children's diseases had still been widespread when the Bates will had been drawn up in 1890, but even then this custom had been falling into obsolescence at the University, and by 1898 the medical faculty apparently had no intention of permanently re-establishing it. The report of the

faculty's views on the best disposition of the gift was made to the Regents orally, but the following statement in the *Announcement* for 1898-99 (p. 6) throws some light on faculty opinion:

In accordance with another provision of the will it is proposed that the title of Elizabeth H. Bates Professor of Diseases of Women and Children be given to Dr. James N. Martin. (The didactic and clinical work in connection with children's diseases will be in charge of the chair of Theory and Practice of Medicine, as heretofore.) It is also proposed that the income from the bequest be allowed to accumulate, and that when a sufficient fund has been acquired a ward be built for sick children, as a memorial of the donor.

During the summer the Board's main concern in connection with the bequest was a legal struggle for the property, certain relatives of Dr. Bates having contested her will. By November, 1898, a court decision affirming the validity of the will had been rendered; still, the Bates chair remained unoccupied throughout the session of 1898-99. Finally, at the Regents' meeting of September, 1899, "the Chair of Obstetrics and Diseases of Women, in the Department of Medicine and Surgery was abolished, and James N. Martin (Hillsdale '80, Ph.M. hon. *ibid.* '83, Michigan '83m) was appointed to the chair of the Bates Professorship of the Diseases of Women and Children at a salary of \$2,000" (*R.P.*, 1896-1901, p. 415). The Board's intentions with respect to the teaching were made clear a month later, when the following resolutions were adopted:

Resolved, That the duties of Dr. Martin, Professor of the Bates chair, Diseases of Women and Children, remain the same as before, with the addition of Diseases of Women.

Resolved, That the instruction in and the treatment of diseases of children be done by Dr. Dock, Professor of Theory and Practice. (*R.P.*, 1896-1901, p. 433.)

Thus, in spite of the apparent implications of Martin's new title, both the association of obstetrics and gynecology were continued—nor has the actual teaching of pediatrics ever been assigned to the occupant of the Bates chair. One of these resolutions brings to light a fact not mentioned elsewhere, namely, that at some previous time—possibly only a year or two before—Martin had delegated the instruction in gynecology to an assistant, concentrating his own efforts on the work in obstetrics, and that he again taught both subjects in 1899.

It was reasonable to establish the Bates chair to fulfill the terms of the bequest, but it was wholly unnecessary to exclude the word "obstetrics" from the title of the chief professorship of the department. Ever since the beginning of medical instruction at the University in 1850, obstetrics, internal medicine, and surgery had been treated as major subjects of equal importance. The occupant of the new chair was expected to be primarily an obstetrician, and this fact should have been indicated by some such official title as the one finally adopted in 1923, which was "professor of obstetrics and gynecology and Bates professor of the diseases of women and children." The actualities of the situation were recognized in the period 1899–1923, however, by the use of the unofficial title, "Bates professor of obstetrics and diseases of women," in the faculty list of the *Announcement*, though elsewhere in the University publications "Bates professor of the diseases of women and children" was the title ordinarily used.

The nominal "abolition" of the chair of obstetrics and gynecology was not the only strange result of accepting the Bates bequest. The amount set aside for the professor's salary was only about one-third of the income of the bequest. As has been noted, the faculty originally endorsed a plan of saving as much as

possible of this income for a building fund for a children's ward. Eventually, in December, 1901, the Regents adopted a motion to make the projected Palmer Ward a children's ward, thus ending the possibility that any of the Bates money would be used for that purpose. Before this happened, however, and while Martin still held the Bates professorship, the Regents established a policy of meeting the regular expenses of the Department of Obstetrics and Gynecology, not by the customary appropriations from the general University fund, but instead, by revenue from the Bates fund. This policy was made effective with the adoption of a resolution that, after October 1, 1900, "the expense of maintaining the Chair of the Bates Professorship of the diseases of women and children be paid from the Bates fund" (*R.P.*, 1896–1901, p. 602).

The obvious reason for the bequest was the donor's desire to enlarge the facilities for medical education, especially for women, in a university that had early admitted women to its medical school, and the greatest deficiency in the Medical Department and in the University Hospital when the bequest was received was the lack of adequate clinical instruction in obstetrics. Had this resolution not been passed the greater part of the Bates income might have been saved for the building and equipping of a maternity hospital as soon as the idea of a Bates ward for children was given up, or—though this was perhaps too much to expect in those days—it might have been used to finance a broad, intensive program of research. A small hospital laboratory equipped with apparatus for the investigation of gynecological and obstetrical cases had been set up in 1897–98, and the Regents in 1901 did appropriate \$500 of the Bates income for additional equipment for this laboratory, but under the plan adopted in 1900, and

with the growth of the department and of its cost of operation, the possibility of obtaining continuous support for research or for other special projects from this source steadily declined. The result of the new policy was, therefore, that the department did not actually benefit from the money. In fact, within a few years the gift became more of a handicap than a benefit, for, while the other clinical departments expanded and were granted successively larger budgets, the Department of Obstetrics and Gynecology was retarded because the Regents refused to appropriate anything for it except the income from the Bates fund. As the principal professorship of the Department of Obstetrics and Gynecology was named in honor of Dr. Bates, her bequest should have been devoted to ways of increasing the efficiency of that department. In justice to the Regents it may be stated that they acted in good faith and thought that under the provisions of the will no action except the one which they took was feasible. It would seem that a donor should specify more definitely the purpose of a bequest and yet give the governing board the greatest possible freedom in its administration.

Martin was aided continuously after the summer of 1888 by James Gifford Lynds ('88*m*), who was promoted in 1892 from an assistantship to the position of Demonstrator of Obstetrics and Diseases of Women. During the year 1897-98 he was Acting Professor of Gynecology. Other assistants, each of whom served under Martin for a briefer period, were Casper K. Lahuis ('96*m*), Dr. Clara A. O. Dedrick, and John J. Mersen (Hope '95, A.M. *ibid.* '98, Michigan '99*m*).

Neither Martin nor Lynds had any national affiliations. Their work was confined to the state. One of the reasons, probably, for Martin's breakdown in health was his custom of operating in

private houses in towns in the neighborhood of Ann Arbor, and then riding through the night in order to keep his University obligations the next day. In 1895 he was granted a leave of absence on account of blood poisoning contracted from operating on a septic case. Another year's leave of absence in 1897-98 was also granted because of ill-health. In 1900, a year before his resignation, he manifested distinct signs of mental instability and these symptoms grew worse until the time of his death in 1913. Lynds resigned with Martin, in February, 1901, and on October 1 of that year Reuben Peterson (Harvard '85, M.D. *ibid.* '89, Sc.D. hon. Michigan '36) became Bates Professor of the Diseases of Women and Children.

Peterson was born in Boston in 1862. After graduating from Harvard University and interning in three Boston hospitals, he came to Grand Rapids, Michigan, in 1890 and established a general practice. Because of his hospital training and inclinations, Peterson, even when engaged in general practice, devoted more and more of his attention to obstetrics and gynecology and in 1897 was elected to membership in the American Gynecological Society. In 1898 he went to the Chicago Post-Graduate Medical School as a professor of gynecology, and a year later he accepted an assistant professorship of obstetrics and gynecology at Rush Medical College.

In the early and middle nineties, instruction in gynecological diagnosis and treatment, as well as in obstetrics, had been given to small groups of students at Michigan. The effort to increase the individualization of instruction was perhaps relinquished to some extent after Martin's illness in 1897; at any rate, as late as 1900, patients were operated on before large classes, while the students sat on hard benches during long, prescribed hours and watched, seeing little and

understanding less of what was done. Clinical teaching in this manner had been an almost universal custom throughout the country in the last decade of the nineteenth century.

Peterson's first task on assuming his duties at Michigan was to increase the effectiveness of the gynecological teaching by having the technique of pelvic and abdominal diagnosis and treatment of diseases peculiar to women taught to small groups of students. At the gynecological clinic, held twice a week, emphasis was laid on differential diagnosis, demonstration of specimens, and the progress and after-treatment of patients operated on at previous clinics. There were frequent ward walks and demonstrations of postoperated patients.

Peterson's second task was to build an obstetrical clinic. Because the town was small this was no easy task, and the University authorities at that time were either opposed to, or at least unsympathetic to, the idea of making the expenditures necessary for such a clinic. It should be borne in mind that until thirteen years before Peterson's appointment, practically nothing had been done to furnish obstetrical material, and that the steady but meager supply throughout most of the period had been obtained with great difficulty. The establishment of a separate detention ward, though not ending the hazard of contagion, was no doubt partly accountable for the fact that by 1900-1901 the number of pregnancy cases observed and treated had been increased to thirty (*Hosp. Rept.*, p. 36). Despite the difficulty of obtaining clinical material for teaching obstetrics, within the next few years the department was sometimes embarrassed by the lack of enough beds for obstetrical patients applying for admission.

As a matter of fact, the time spent in waiting for an adequate supply of obstetrical material was not wasted, how-

ever, for it was found possible to teach the principles of the mechanism of labor, at little expense, by means of the manikins with which the department was then abundantly supplied. The students, meeting in small groups, were thoroughly drilled in this way, so that even those who had had no experience in actual deliveries might have some practical knowledge of scientific obstetrics before entering medical practice. Students from Michigan interning at outside hospitals sometimes discovered that they were better grounded in the fundamental principles of normal and abnormal obstetrics than were fellow interns who had delivered, in hospitals or in outpatient services, six or more women. This method of teaching has been retained as one of the principal features of obstetrical instruction at the University.

During Peterson's first years at the University, although there were no instructors in the department, there were three or four assistants at a time, each of whom remained about two years. One of these men, Wales Melvin Signor ('05m), was advanced to an instructorship in 1906. He as well as each of the next two appointees to this position held it for only a year, but after 1909 the average tenure was lengthened. By 1917 it was customary for an instructor to remain three or four years, and the number of instructorships had been increased to four.

A co-operative interdepartmental arrangement was made in 1902, whereby one assistant appointed to the staff of the Department of Obstetrics and Gynecology was responsible for the clinical laboratory work of the department and also taught gynecological pathology in the Department of Pathology. Ralph Luther Morse ('02m) was the Assistant in Obstetrics and Diseases of Women, in charge of laboratory work from 1902 until 1904, when he was succeeded by

Samuel Reese Haythorn ('04*m*). Frank Clarence Witter ('06*m*) did the same work from 1906 until 1908, first as assistant and later as demonstrator; he was then promoted to a regular instructorship in obstetrics and gynecology, and the laboratory work was assigned to Neal Naramore Wood ('08*m*). In his second year on the staff, Wood was both Instructor in Obstetrics and Gynecology and Demonstrator of Obstetrics, in charge of laboratory work, but in 1910 the second half of his title was dropped and the interdepartmental staff arrangement was discontinued.

In 1902-3 the obstetrical ward was still so small that only about thirty patients received treatment. The policy of granting free maintenance during the last month of pregnancy, as well as after delivery, resulted in its being almost always full, for physicians throughout the state were glad to send certain patients who could not have afforded to come under a less liberal plan.

Eugene S. Gilmore, Superintendent of the University Hospital from 1900 until 1908, did his best to secure an increase in the obstetrical material. The new Hospital addition, Palmer Ward, had been intended primarily for children, but when it was opened, in 1903, Gilmore and Dr. George Dock, head of the department in which pediatrics was then taught, consented to the temporary use of a part of it as an obstetrical ward. When this change was made, the number of obstetrical beds was more than doubled.

The kindness of Dr. Dock in approving this arrangement was greatly appreciated, but Dr. Peterson felt that his patients were there only on sufferance. Consequently, in November, 1903, Peterson persuaded the medical faculty to make a formal request to the Regents to "rent a separate house near the hospital for the use of obstetrical cases," both

in order that these cases might receive proper care and in order that Palmer Ward might be utilized to better advantage (*R.P.*, 1901-6, p. 295); but the Regents took no action on this faculty request.

A curious incident in the continual struggle to secure more obstetrical patients should be recorded here. In those days there was little hope of obtaining anything for a department without the approval of James H. Wade, Secretary of the University and watchdog of the University treasury. Peterson, therefore, went to him with a plea that obstetrical patients be admitted free of charge. Wade was astounded and said that such a request was ridiculous, because it was sufficient that every student witnessed one delivery in the hospital amphitheater.

During Wade's illness in 1905, Peterson appealed to Regent Charles DeWitt Lawton, chairman of the medical committee of the Board, and obtained authorization to admit "certain obstetrical patients to the hospital free of cost, to remain three months" (*R.P.*, 1901-6, p. 501). This action was taken in February. In May, as soon as Wade had recovered from his illness, he persuaded the Regents to limit the number of free obstetrical beds to three.

A frame building intended to be made into a contagious-disease ward, the Penny house, was moved from North University Avenue in 1905 to a site close to the small building then used for contagious cases, at the rear of the Medical Ward.⁴ An alternative plan of erecting a separate, modern contagious-disease hospital was under consideration at the time, however, and as the Penny house was still empty in October, 1905, it was

⁴ The Medical Ward, the westernmost of the three main buildings on Catherine Street, had been the Homeopathic Hospital between 1891 and 1900. It was destroyed by fire in 1927, when it was known as the Convalescent Ward.

remodeled to serve as an obstetrical ward, at a cost of \$335. Despite this decision the uncertainty continued, and the building stood unoccupied throughout the winter and early spring, but finally, in May, 1906, after its use as a detention ward had once more been seriously considered, the Regents again ordered that it be made into a maternity ward. They authorized purchases of furniture and other equipment to the amount of \$1,300, this sum to be taken, if possible, from income from the Bates fund, and also authorized the employment of four additional nurses for the ward, but ruled that there should not be more than ten obstetrical cases in the hospital at a time.

Both before and after the establishment of the pediatrics clinic, it was felt that the care of the normal infant should be a part of obstetrical teaching. The students were, therefore, instructed in infant feeding throughout the six weeks during which many of the babies were retained in the clinic before being placed in institutions. Abnormal infants were referred to or transferred to the Department of Pediatrics. In 1907-8 a quarantine of the surgical wards resulting from an epidemic of scarlet fever halted the admission of new patients to the obstetrical and gynecological service. Such quarantines and the lack of an adequate number of beds had created a long waiting list, and many prospective patients had had to be turned away. Yet, in the five years, 1903-8, there had been an increase of nearly 100 per cent in the number of patients treated each year, and the increase in obstetrical work had been proportionate to the growth of the department's clinical work as a whole.

Another frame house intended as a ward for contagious diseases was moved to a site a little to the west of the Maternity Ward in 1908, but remained empty while city and University officials

again discussed the possibility of building a modern contagious disease hospital. Peterson suggested that this second house be used instead as an addition to the obstetrical clinic and outlined a plan whereby the department might obtain a larger proportion of obstetrical patients in the earlier stages of pregnancy.

These suggestions were approved by the Regents, and at last the department came into possession of an obstetrical clinic worthy of the name. The newly acquired building was made into a residence for waiting patients and was called the Maternity Cottage; and the former Maternity Ward was changed into a Maternity Hospital, for patients in labor and for post partum patients. At this time the main room of the Maternity Hospital was equipped for small demonstration classes in obstetrics.

In the Maternity Cottage eighteen to twenty patients were always available for demonstrations of the various fetal presentations, normal and abnormal. These presentations were also being demonstrated by the use of manikins. In all, the department had about thirty obstetrical beds and more teaching material than was furnished by the type of teaching clinic in which there were more deliveries but few waiting patients. Success in maintaining this necessary teaching material lay in the fact that the patients were charged only while waiting, and this nominal sum, \$2.50 a week, they could pay by performing certain duties for the hospital, such as the preparation of bandages and the repairing of linens, during the waiting period.

One hundred and one deliveries were reported for the year ended June, 1910. The list contained an unusually large proportion of abnormalities, which were utilized for purposes of instruction. In the next few years the department continued to grow, in spite of serious handicaps.

It should be borne in mind that since 1850, although obstetrics and gynecology had been emphasized as major subjects and taught on a par with medicine and surgery, during the first forty years almost nothing had been done to develop the clinical work of the department. Very little more had been accomplished in the nineties. Since 1900, however, the two small buildings had been secured and more liberal rules had been established, whereby, through reduced rates, obstetrical material was obtained.

Seen in this perspective, the situation of the department in the years which followed 1908 might appear to have been favorable. Actually, however, conditions were so unsatisfactory that, from the modern point of view, it seems hardly possible that they could have been endured. Both wooden structures were fire-traps, and it had been intended that they be used for obstetrical cases only until suitable quarters could be secured. The proximity of the small detention ward to the Maternity Hospital constituted a serious threat to the welfare of post partum patients. Surgical patients in the gynecological service were still endangered by the septic condition of the main Hospital, which in addition to having been poorly designed had not been properly kept in repair. The situation was somewhat improved by the opening of two new buildings in the decade 1901-11 (Palmer Ward and the Eye, Ear, Nose, and Throat Ward), because this additional space provided some relief from congestion in the surgical wards.

An attempt was made in 1913 to establish an outpatient obstetrical service for poor patients referred by physicians or charitable societies, but for several reasons—principally because of the small size of the town—the effort proved a failure and was abandoned.

In June, 1914, the much-needed Contagious Disease Hospital, given by the

city of Ann Arbor, was made ready for occupancy. With the new unit in operation, maternity patients with doubtful or pronounced contagious diseases could be cared for satisfactorily. The installation of this ward benefited every department of the Hospital, because it prevented epidemics and quarantines, and for the Department of Obstetrics in particular, it provided relief by doing away with the need for the two-room contagious shack, which had long menaced the welfare of obstetrical patients. Plant alterations involving a new annoyance were made, however, in the same year: the track of a trolley line for carrying coal from the Michigan Central Railroad to the new heating plant on Washington Street was laid between the Maternity Hospital and the Maternity Cottage. This greatly increased the difficulty of transporting patients in labor from one building to the other—not to mention the noise of the loaded coal trains, running between the buildings at night with clanging bells.

Peterson was Medical Director of the University Hospital and executive officer of its medical committee from 1913 until 1920, and, in addition to his arduous hospital executive duties, carried on his administrative duties in the Department of Obstetrics and Gynecology.

In 1915 Peterson was able to secure legislation whereby the benefits of Act No. 274 of 1913 for sick or crippled children were duplicated for adults, in Act No. 267. By these acts children and adults needing hospital care, but unable to pay their maintenance and travel costs, could be sent to the University Hospital by order of the county probate judges. By a provision of the adult act, pregnant women were included. Had it been possible to have the hospital expenses of adults paid out of the general state fund, as were those of the children, there would soon have been plenty of obstetrical material, but the fact that

these expenses were charged to the counties acted as a deterrent, since the county supervisors were held accountable for expenses and it was cheaper to have unmarried mothers without funds confined in unsanitary county farms. Despite this handicap, many obstetrical patients, married and unmarried, were sent to the University Hospital under the provisions of Act No. 267 of 1915.

J. B. Draper, Superintendent of the University Hospital since 1908, was accidentally killed in 1915, and the policy of the administration, which had been that of building up the obstetrical clinic by charging little or nothing for maternity service was changed.

A chance was seen to increase the hospital receipts from state patients sent by the judges of probate under Act No. 267 of 1915. Gradually, the charge for such patients was raised, with the result that the counties naturally declined to refer them to the Hospital.

The report of the business officer of the Hospital for the year 1921-22 included the following statement, which shows the failure to grasp the fundamental difference between obtaining obstetrical teaching material and obtaining material for teaching the other clinical subjects: "We might also mention the fact that if the hospital had been allowed to charge regular rates for services in the Maternity Department our receipts would have been increased by from \$20,000 to \$25,000" (*Hosp. Rept.*, 1921-22, p. 19).

These figures were based upon the supposition that the same number of patients would have been admitted to the service. This was an absurdity since, as a rule, unmarried pregnant women had no money, and state patients could have been cared for at less expense.

Dr. Peterson was called into service in World War I in November, 1917, and served until January, 1919, in the Medi-

cal Corps of the United States Army. Fortunately, so far as the teaching of obstetrics and gynecology was concerned, he was stationed in Michigan and could supervise the work of the department. He also remained as medical director of the University Hospital.

When the United States entered the war, the obstetrical and gynecological staff consisted only of the head of the department and four instructors. Two of these men, Frederic Morris Loomis ('09, '12m) and Rudolph Artiles Bartholomew ('08, '12m), left permanently within the next fifteen months, and John Wesley Sherrick ('12, '15m) was absent on leave for two years. The only instructor to remain was Leslie Lee Bottsford (Williams '09, Michigan '14m), who, in 1919, received the first appointment to an assistant professorship to be made in the department. Bottsford left the position in 1920 and was succeeded by Sherrick, who left in 1922, and the position was held during the next year by Roland Spuhler Cron ('16, '17m). There was no assistant professor from 1923 until Norman Fritz Miller ('23, '20m) was advanced to the position in 1925, nor for two years after Miller left in 1926.

More time was given to gynecology than to the obstetrics division of the department, because of the exceptional increase in the number of such cases admitted and requiring operative treatment. Although the counties hesitated and often refused to send pregnant women to the clinic, they could not refuse to send those cases requiring the services of a specialist. Thus the gynecological beds from 1901 on were in great demand. Because of the amount of time consumed by the staff in nonoperative and operative care, the question often arose as to whether or not it would be wise to limit the number of gynecological cases, yet such restrictions were never adopted.

The department became, in its special field, a postgraduate school where men were thoroughly trained before entering private practice. It now seems axiomatic that staff members should be given every possible opportunity for advancement in clinical knowledge and skill; yet such was not the custom as late as 1901, when men spent years as part-time assistants, picking up what crumbs of knowledge they could but having few or no opportunities to perfect their surgical technique. Furthermore, any change was bitterly opposed by the heads of clinics, trained differently, who thought everything should center in them.

It was stated in the *Announcement* in 1913 that the two frame buildings were being used only "temporarily," for obstetrical patients. Inadequate and dangerous as these old buildings were, however, during the next twelve years they continued to be the only quarters available for active and waiting maternity patients.

In 1925, before the completion of the new Hospital, the Eye, Ear, Nose, and Throat Ward, a brick building erected in 1910, was remodeled at a cost of more than \$20,000, into an eighty-two-bed obstetrical hospital well adapted for the care of waiting and active maternity patients. The work in clinical obstetrics has been carried on since 1925 in this brick building, renamed the Maternity Hospital.

With the transfer of obstetrical patients from the two antiquated wooden buildings to this brick structure, and with the provision for gynecological patients in the new Hospital, a new era began. Gone were the old days when entire wards were quarantined for weeks because of outbreaks of contagious disease. No longer did the surgeons have to contend with serious infections which could be ascribed only to unsanitary hospital conditions.

Between 1919 and 1927 the departmental staff was increased from five to seven, exclusive of interns and assistants below the rank of instructor. James Mortimer Pierce ('23m), who was appointed Instructor in 1925, was made Assistant Professor of Obstetrics and Gynecology in 1928, and in 1930 he became the first member of the staff of the department to be advanced to an associate professorship. Those instructors who remained during the twenties for a period of three years were: Theodore Wright Adams ('18, '20m), 1921-24; William Henry Rumpf (Minnesota '20, B.Med. *ibid.* '21, M.D. *ibid.* '22), 1923-26; Lawrence Edward McCaffrey (M.D. McGill '21, C.M. *ibid.* '21), 1924-27; Harold Arthur Furlong ('22, '24m) and James Valentine Campbell ('24m), 1926-29; L. Grant Baldwin ('25m) and Harold Smith Morgan ('25m), 1927-30. Lewis Ernest Daniels ('11, M.D. Harvard '20) was an instructor in the department from 1922 until 1925 and returned in 1930.

In December, 1930, after thirty years of service Dr. Peterson resigned his position as head of the Department of Obstetrics and Gynecology. He was succeeded by Dr. Norman F. Miller, one of his former assistants, who some years before had gone to the University of Iowa to become associated with Dr. Everett D. Plass, head of the Department of Obstetrics and Gynecology there.

In the nine years which followed Miller's return to the University in 1931, the staff usually consisted of eight or nine faculty members, in addition to the interns, most of whom remained as instructors for two or three years after completing the internship. By 1937 it was customary to designate a man "intern" in the first year of his internship, "assistant resident" in the second, and "resident" in the third.

Associate Professor James M. Pierce left the department in October, 1931,

and in the same year Dr. Daniels and Norman Rudolph Kretschmar ('24, '26m, M.S. '31), instructors, were made assistant professors. Glenn Allan Carmichael ('28m) served as an instructor for three years before leaving the department, as did Woodburn Kenneth Lamb (Alma '26, '30m), David Charles Kimball (27, '30m), and Sprague Heman Gardiner ('30, '34m, M.S. '39). James T. Bradbury (Montana State College '28, Sc.D. Michigan '33) was selected to fill a special research assistantship in the department in 1933. He was transferred to an instructorship in 1938, and a year later the research position was filled by

the appointment of Lore Sophie Marx (Ph.D. Heidelberg '28).

Carl Parker Huber ('24, A.M. '25, '28m) served as an instructor from 1930 until 1936, and for three years of that time, 1932-35, was Reuben Peterson Instructor and Fellow in Obstetrics and Gynecology. Kretschmar⁶ was promoted to an associate professorship in 1938, and Clair Edwin Folsome (Albion '25, Michigan '33m, M.S. *ibid.* '38), after four years as an instructor, was appointed Lecturer in Obstetrics and Gynecology in 1939.

REUBEN PETERSON*

* Died in 1943.

* Died November 25, 1942.

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THE DEPARTMENT OF OPHTHALMOLOGY

THE first instruction in ophthalmology at the University of Michigan of which there is record was given in March, 1870, when George Edward Frothingham ('64m) became Lecturer in Ophthalmology. He had come to the University three years before as Prosector of Surgery and Assistant Demonstrator of Anatomy, but had become interested in ophthalmology, which had been established as a separate chair in the Miami Medical College in 1860, and in the College of Physicians and Surgeons in New York in 1869. His successor, Dr. Flemming Carrow, wrote regarding Frothingham's part in making Michigan the third medical school in America to establish a Department of Ophthalmology: "Not only did he demonstrate the necessity for this chair, but he clearly showed his ability to fill it. . . . The clinics in ophthalmology were the most numerous attended of any . . . west of Philadelphia" (Carrow, p. 443).

Dr. Frothingham was born in Boston in 1836, received his early education at Phillips-Andover Academy, and for some years taught school in Massachusetts. Later, he began the study of medicine under Dr. William Warren Greene ('55m), eminent New England physician and surgeon, but came to Michigan in 1864 to complete his medical studies. After his graduation he engaged for a time in general practice in North Becket, Massachusetts, but when Greene, his old preceptor, was called to Michigan in 1867 as Professor of Surgery, he brought young Frothingham with him. It was undoubtedly Frothingham's increasing interest in ophthalmology and aural surgery that led not only to a gradual decrease of his work in anatomy but also to

his appointment to the professorship of ophthalmology and aural surgery in 1872.

Evidence, however, of the minor position of ophthalmology in Frothingham's teaching and clinical duties may be gathered from a report submitted to the Regents in June, 1875, by Acting Dean Maclean:

That in addition to his present work as Professor of Ophthalmology and Otology, the incumbent of the proposed chair give his attention to daily teaching and demonstration in the dissecting room on such topics and matters as may arise in the every day work of dissecting; and that the direction of this work shall be under his personal supervision.

That he shall, on consultation and by mutual agreement with the Professor of Anatomy, give lectures on such topics as may be decided upon, for the purpose of allowing the Professor of Anatomy more time for the special instruction of the students in the Dental School in subjects not usually brought before general classes in medicine.

That he be required to hold the students to a strict examination and account for their work in the department of Practical Anatomy, giving certificates of the same on the completion of such work.

That he shall have charge of the finances of the department, and shall make a yearly report of the same to the Board of Regents.

That he shall have supervision of, and shall give attention to, the procuring of anatomical material; but on account of the labor in this work, and the extra duties required of him, he shall be allowed an assistant, who shall be styled the Demonstrator of Anatomy. The duties of the Demonstrator of Anatomy shall be defined by the Professors of Anatomy and of Practical Anatomy, and he shall be required to devote his entire

time to the practical work of this department. (*R.P.*, 1870-76, pp. 448-49.)

The addition to his title of the professorship of practical anatomy at this time suggests the difficulty of obtaining anatomical material. Frothingham had taken this part of his responsibility so seriously and had advanced the matter so vigorously before the legislature that a law was passed in 1876 which became a model for subsequent enactments in other states.

Frothingham continued to hold the chair of ophthalmology and aural surgery, under various titles, for nineteen years, until he withdrew from the University as a result of his advocacy, together with that of Dr. Donald Maclean, of the removal of a part of the University's medical curriculum to Detroit. Neither man felt that adequate clinical material could be obtained in Ann Arbor. One of them was said to have remarked that "one might as well undertake to raise oranges in Canada as to have a complete clinic in Ann Arbor." There ensued a bitter battle which was greatly publicized by the newspapers of the times. Largely as a result of President Angell's masterly analysis of the situation, the plan for a change was rejected. Frothingham accordingly resigned and devoted his entire time to his Detroit practice. He died in Detroit, April 24, 1900.

Dr. Frothingham's personality was pleasant and agreeable; a man of original ideas, great energy, and ability as a speaker, he took a prominent part in discussions within the Medical Department, as well as in the State Medical Society. He was active in a movement toward a general elevation of requirements for the degree of doctor of medicine, and he deplored the tendency to specialize without first having attained a proper proficiency in general medicine. He was equally emphatic in his rejection

of the idea that the so-called "classical" education is the best preparation for a course in medicine. He was also one of the first members of the medical faculty in 1875 to defend the Regents' position in regard to the establishment of the Homeopathic College, contending that knowledge was the most effective antidote to false theories. His position was later sustained by the American Medical Association, in which in 1888 he was chairman of the section on ophthalmology.

Throughout Frothingham's years at the University, ophthalmology developed steadily. In 1877 President Angell reported the success of a large number of surgical operations performed on the eye and ear, and in 1878 he noted that of two hundred operations performed in the Hospital thirty-three were for cataract, and of these, thirty were successful. In 1881, an eye and ear ward was added to the University Hospital at a cost of some \$2,500. At that time few men in the country were doing cataract surgery. Frothingham developed and perfected his technique as rapidly as knowledge of the times permitted. After the first use of cocaine in 1884, as a local anesthetic in eye surgery, operations for cataracts greatly increased. Dr. Frothingham became more interested in intraocular surgery. He kept accurate and complete records of his surgical cases, and he frequently reported his results in the *Journal* of the American Medical Association. Probably 90 to 95 per cent of the surgery done during those years was for cataracts, since glaucoma surgery of any extent was as yet unknown, and squints were treated most frequently with corrective glasses. Reports on the technique of the cataract operation were prevalent, the so-called "flap" type being the most universally accepted. Frothingham took part in the dispute among ophthalmologists regarding the kind and

extent of postoperative care to be accorded cataract patients. Then, as now, there were advocates of a long and strict confinement of the patients to bed with both eyes covered, whereas others allowed their postoperative cases to be out of bed on the first postoperative day. Dr. Frothingham pursued a middle course. He felt neither of the extreme views was justified.

The teaching of ophthalmology through the early formative days of the department was decidedly limited compared to the amount of instruction and clinic material which students now receive. In 1880 three courses in ophthalmology were given. One was entitled Eye and Ear Clinic and consisted of seventy-two lectures; another, listed in the *Announcement* as Ophthalmology and Otolaryngology, offered twenty-four lectures; and the third course, Clinical Ophthalmology, included 128 lectures and demonstrations. Dr. Frothingham operated before the students twice a week. In his opening lecture of the year he often told the students: "... you must know you will profit none by my operations unless you know the anatomy and physiology of the organ thoroughly. I can demonstrate the fundamental principles. The world will be your clinic" (Vaughan, *A Doctor's Memories*, p. 201). One may imagine the operating amphitheater in the old Pavilion Hospital crowded with students straining to see a cataract extraction. Those students in the uppermost benches must have had difficulty seeing the eye, let alone a lens being tumbled from it. Today students are allowed to stand by the surgeon's elbow to watch the operations. Many great ophthalmologists received their initial tutelage under Frothingham. Among them may be mentioned Dr. John E. Weeks, of New York, and Dr. Harold Gifford, of Omaha.

Upon Dr. Frothingham's resignation

in July, 1889, Dr. Flemming Carrow (George Washington '70, M.D. *ibid.* '74, A.M. hon. Michigan '03) was appointed his successor, as Professor of Ophthalmic and Aural Surgery, and Clinical Ophthalmology, at a salary of \$2,000. By that time both ophthalmology and otology had become of great importance in the medical curriculum, and it became necessary to devote more and more time to these subjects. Thus, when Carrow assumed his new duties, he gave up his work in anatomy. Dr. Carrow had had a varied experience. He had studied ophthalmology with Dr. C. R. Agnew in New York City, and in London, Berlin, and Vienna. In 1875 he was appointed surgeon in charge of military service for the Chinese government at Canton. During this period he was also medical officer to the British consulate (1878) and customs-medical officer in 1879. He saw active service with the Chinese army at the Gulf of Tonkin, and two years later he became American vice-consul. Later, he returned to America and practiced medicine in Bay City, Michigan, until he was appointed in 1889 to a professorship in the University.

Many of Dr. Carrow's lectures to the students have been saved and are still available. They are written in beautiful handwriting, giving the fundamentals of diagnosis and treatment of many diseases affecting the eye, ear, nose, and throat. Characteristic of these lectures are the bits of philosophy and hints to the student on the practice of the art of medicine. Dr. Carrow had a flair for the dramatic. He enjoyed telling the students how they should run their offices. He said that there should always be a neat pile of clean towels on a table in the examining room. When the patient entered one should fasten a towel about his neck and place another one over his lap and another one over the near-by table. When the patient got up to go the

towels should be nonchalantly tossed into a corner. After the patient left, however, one should pick up the towels, shake them off, and place them back in the clean pile.

The work in ophthalmology and otology flourished under Dr. Carrow's direction. Both fields were developing so rapidly that there was more work than one man and his assistant could handle. Dr. Carrow remained at Michigan until September, 1904, when he resigned to take up the practice of his specialty in Detroit. After some years he retired to Traverse City, where he died June 23, 1928.

At the time of Dr. Carrow's resignation in 1904, Walter R. Parker ('88, M.D. Pennsylvania '91, Sc.D. hon. Michigan '35) was appointed Clinical Professor of the Diseases of the Eye, becoming Professor of Ophthalmology the following year. At the same time R. Bishop Canfield ('97, '99m) was appointed Clinical Professor of the Diseases of the Ear, Nose, and Throat. After some years' experience in various hospitals in the East, Parker began the practice of ophthalmology in Detroit in 1894, interrupted in 1896 by a year's postgraduate study in Vienna. From 1899 to 1904 he was clinical assistant in ophthalmology in the Detroit College of Medicine.

During his period of twenty-eight years of service in the Medical School wide recognition came to Dr. Parker in his special field. During World War I he was colonel in charge of the Division of Head Surgery in the Surgeon General's office, under General W. C. Gorgas. His numerous contributions to ophthalmic literature, his service on the editorial staff of a number of journals, and his membership in the Council of the International Congress of Ophthalmology bear witness to the recognition accorded his work in the University.

The postgraduate training in ophthalmology developed by Dr. Parker is still followed and is considered the model for the teaching of clinical ophthalmology to undergraduates and as specialized training for postgraduate students. Today, the Department of Ophthalmic Surgery has one of the outstanding clinics in the country.

Because there were no volunteer assistants to be obtained in Ann Arbor, it became necessary to develop a large resident staff. Gradually, within the Medical School, a three-year rotation service was instituted. A graduate is actually appointed for four years of service—one year spent in a general hospital of his election and three years on the ophthalmic service at the University—one year as assistant resident, one year as resident, and one year as instructor. While this service was inaugurated primarily to assist in teaching ophthalmology to the undergraduates, it has in reality developed a postgraduate service that is well recognized and is generally known as the Michigan rotation system. Each year one or two men are graduated who are thoroughly trained in ophthalmology and who have had some experience in teaching. No degrees are given, but it is now so arranged that members of the staff holding a collegiate degree may enroll in the postgraduate school as candidates for the degree of Master of Science in Ophthalmology. That the results have been rewarding is shown by the responsible positions attained by graduates of the department.

Upon Dr. Parker's resignation in July, 1932, to become Emeritus Professor of Ophthalmology he was succeeded by George Slocum ('89m). After four years' general practice in the state of New York, Dr. Slocum spent a year in postgraduate work in the University Medical School, becoming Demonstrator in Ophthalmology in 1904, which title he held

until 1913, when he became Instructor in Ophthalmology. He continued to serve the department as Assistant Professor until 1930. At the time of his appointment as Professor of Ophthalmology in 1932 he had been Associate Professor for two years. Dr. Slocum had been in the department throughout Dr. Parker's term as chairman. As Dr. Parker practiced and lived in Detroit and came to Ann Arbor two days a week for surgery and clinic, Dr. Slocum did a large share of the student instruction and supervising of the outpatient clinic. He also had a private practice in Ann Arbor. Dr. Slocum was a member of many medical and scientific societies and the author of numerous publications in various journals, as well as of a textbook entitled

Junior Ophthalmology. He died on March 24, 1933.

Dr. Slocum was succeeded by Francis Bruce Fralick ('27m, M.S. '35) as Associate Professor of Ophthalmology and acting chairman of the department. In February, 1938, he was appointed Professor of Ophthalmology and chairman of the department. Under Dr. Fralick postgraduate research and training have shown much progress. Men who are in their fourth year of training now do a large part of the clinic surgery. They are well qualified on ophthalmic surgery when they have finished their four years at the University and are as thoroughly trained as possible for the American Board Examinations in Ophthalmology.

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THE DEPARTMENT OF OTOLARYNGOLOGY

THE Department of Otolaryngology originated as a distinct and separate entity in the Medical School in 1904 under the direction and leadership of Roy Bishop Canfield ('97, '99m). At the age of twenty-nine he began his first year of service in the University as Clinical Professor of the Diseases of the Ear, Nose, and Throat, and one year later, in 1905, he was promoted to the rank of Professor of Otolaryngology. Although Dr. Canfield was preceded by such eminent men as Dr. George Edward Frothingham, Professor of *Materia Medica and Ophthalmology*, 1872-89, and Dr. Flemming Carrow (George Washington '70, M.D. *ibid.* '74, A.M. hon. Michigan '03), Professor of *Ophthalmic and Aural Surgery, Laryngology, and Clinical Ophthalmology*, 1889-1904, the functions and activities of these men were varied and pertained more significantly to ophthalmology than to the field of the ears, nose, and throat. Consequently, the appointment in 1904 of Dr. Canfield marked the separation of ophthalmology from otolaryngology and laid the foundation for the subsequent growth and development of otolaryngology in the Medical School.

Animated by a passion for the study of his specialty and familiar with the latest developments and surgical techniques, Dr. Canfield plunged vigorously into his assignment, organized a modern curriculum, and brought early recognition to the Medical School through distinguished achievements in the field of otolaryngological surgery. He was a pioneer of modern otolaryngology in the Middle West. Local anesthesia was successfully attained by his skillful methods, innovations in throat surgery were instituted, and his operations upon the

nasal septum and complete procedures upon the nasal accessory sinuses were brilliantly performed. His astute knowledge of diseases of the temporal bone and his amazing dexterity in surgical approaches to this structure soon brought him wide recognition in the field of otology. It may be said of Dr. Canfield that he was the founder and one of the chief builders of modern otolaryngology in Michigan from the point of view of pedagogy and practice.

During his first five years at the University Dr. Canfield made important additions to his surgical armamentarium in spite of inadequate facilities. He established his operating room in the basement of the surgical wing of the old hospital, built in 1889-91, beneath the stairway leading to the main surgical amphitheater, and began to practice the procedures which he had learned through a rich experience in the Massachusetts Eye and Ear Infirmary in Boston and in clinics abroad. It has often been said that the operating room space allotted Dr. Canfield barely admitted the patient, the doctor, and the anesthetist, thus making it necessary for the surgical nurse to take her position in the corridor and hand instruments to Dr. Canfield through the open door. But it was under such conditions, with poor facilities and meager equipment, that the young otolaryngologist achieved an international reputation through some of the most noteworthy surgical successes of his life. When one considers what Dr. Canfield accomplished in those early years, admiration for his courage and invention is exceeded only by the widespread acknowledgment of the tremendous influence he exerted in the field of otolaryngology and in the progress of medicine.

Dr. Canfield's achievements were in keeping with the excellent training he had received in the field of otolaryngology. After his graduation from the Medical School in 1899, he was appointed assistant to Dr. Carrow, but resigned the post to become house surgeon at the Massachusetts Charitable Eye and Ear Infirmary in Boston. Later, he engaged in clinical work at the New York Eye and Ear Infirmary in New York City. During this early period he was inspired by the teaching of such eminent otolaryngologists as Dr. Clarence John Blake, of Harvard, Dr. Fred L. Jack, of Tufts Medical School, and Dr. Cornelius Godfrey Coakley, of Bellevue Medical School. Upon the completion of Dr. Canfield's services in Boston and New York, he went abroad for two and one-half years, where he devoted himself to studies under the leadership of some of the most distinguished physicians and teachers in Europe. He came under the influence of such men as Fraenkel, Jansen, Halle, Krause, and Friedlaender, of Berlin; Schwartze, of Halle; and Killian, of Freiburg. Thus, he had obtained a thorough and comprehensive training under the direction of many of the great academicians of the period. Upon his return to the United States, Canfield received the appointments of attending laryngologist to the New York City Clinic for Communicable Pulmonary Diseases and assistant aural surgeon to the Manhattan Eye and Ear Hospital. In June, 1904, he was elected to membership in the American Laryngological, Rhinological, and Otolological Society, Inc., and in October of the same year, he became a fellow of the New York Academy of Medicine.

Upon assuming his professorship at Michigan in 1904, Dr. Canfield set about organizing undergraduate and graduate education in his department. Classes in applied anatomy of the ear, nose, and

throat were instituted for the junior students, and clinical instruction of a genuinely practical nature was given the members of the senior class. On every occasion he emphasized the importance of paring subjects down to their essentials and presenting only those studies in the specialties that would be of subsequent value to the general physician. This point of view he retained all his life. His didactic lectures and clinical presentations always reflected most convincingly his determination to assist the student in preparing himself for the general practice of medicine.

Dr. Canfield never failed to display a keen interest in graduate medical education. As early as 1906, in co-operation with other members of the clinical faculty, he organized a plan of graduate training which has developed into one of the most adequate and creditable systems found anywhere in this country today. Under this plan the young doctor joined the hospital staff as an intern and served in this capacity for a period of one year, with maintenance in the hospital. In the second year he was appointed demonstrator at a small salary sufficient to cover the cost of a meager livelihood, and in the third year under the rotation system became an instructor with a somewhat larger stipend. At this stage in his education he was charged with important responsibilities of an academic and clinical nature. Thus, the young physician studied the basic principles of otolaryngology and progressed through a comprehensive curriculum of training until in the third and final year, he was given the title of instructor on the medical faculty and vested with the duties and responsibilities of teaching medical students and of treating the sick. The young man upon completion of such a service had acquired the fundamentals of his specialty and was thoroughly competent to practice otolaryngology in all

its medical and surgical aspects. The fact that every man now living who has finished such a training at the University of Michigan is one of the outstanding otolaryngologists in his community and a much respected member of the profession is proof of the thorough manner in which this subject was taught him during his service on the otolaryngological staff. The early services were for a period of three years, but the time was later lengthened to four and finally to five years. The four- and five-year services included a general rotation internship immediately upon graduation from the Medical School, although such a requirement was not maintained in the early years when the three-year plan was in operation. Every clinical service in the University Hospital at the present time conducts its graduate training upon this program, and the teaching and clinical services rendered by the various departments in the Hospital are made possible by this system of staff rotation.

In September, 1907, Canfield appealed to the medical faculty and thence to the Board of Regents for a special appropriation sufficient to construct "a proper building for eye, ear, nose and throat cases." No official action was taken on the matter until November 30, 1908, when De Nancrède moved "that the Faculty of the Department of Medicine and Surgery request the Honorable Board of Regents to erect a building for the accommodations of eye, ear, nose and throat cases to cost \$60,000."

In March, 1909, the drawings for the new Eye, Ear, Nose, and Throat Ward were completed and submitted for bids. The building, to be erected at a cost of \$25,000, was to consist of three stories and a basement; the basement was to be given over to a waiting room, offices, laboratories, staff rooms, and cubicles for the examination of patients; the first floor, to contain the operating units,

several two-bed rooms, and a large ward for patients; the second floor, to be devoted entirely to patient accommodations; and the north end of the third story, to furnish quarters for the interns of the two departments, Ophthalmology and Otolaryngology. The southern extremity of the third story was to be a contagious unit to be occupied by otolaryngological patients afflicted with communicable diseases. The plans met with the approval of the Regents, and in the summer of 1909 construction of the new building was begun. It was situated on the brow of the hill north of the surgical building and connected with the latter by means of a one-story corridor. As pointed out by Dr. Canfield in one of his letters to the contractor: "The site to the north of the present hospital will present several advantages; there is plenty of room here, it is the quietest part of the hill, there will be fine light for the operating rooms, the Contagious Unit is at a distance from all other buildings and it is convenient to the administrative offices."

The new building furnished accommodations for fifty-three patients. In the spring of 1910, in addition to the regular hospital furnishings, the equipment included such modern apparatus as an S. S. White surgical engine and drills for bone surgery, material and supplies essential to the complete outfitting of a "laboratory worthy of the name," an ear operating table especially designed and built by the Scanlan Morse Company, a Rauch gastroscope purchased from Louis and H. Loewenstein, Berlin, Germany, and a balopticon used for projection purposes in the teaching of medical students.

The duties and obligations of the department were varied. Craniotomies were performed, and the Hudson drill was frequently used in making initial openings into the skull. The successful

use of the bronchoscope for the removal of foreign bodies in the bronchi brought early recognition to the department, and the gastroscope, the employment of which has undergone a recent revival and which has become a popular instrument of precision in the diagnosis of lesions of the stomach, was first used by Dr. Canfield in the University Hospital in 1910. Operations upon the throat, nose, and sinuses, and complicated procedures in the ear and mastoid had become routine experiences by this time.

Further evidence of Dr. Canfield's varied interests and his alertness in seizing upon recent scientific discoveries, is contained in a letter that he wrote to Simon Flexner, of the Rockefeller Institute, on October 3, 1910: "Have been much interested in reading of the work being done with Ehrlich's 606 and would appreciate it very much if you would send to the clinic of Otolaryngology some of this preparation. I shall be pleased to keep you informed of what success we have with it." This drug was subsequently administered in the Department of Otolaryngology for the treatment of syphilis until Dr. Udo J. Wile's appointment to the Department of Dermatology and Syphilology in 1914, when the treatment of this disease was relinquished to his supervision.

As early as 1907 Dr. Canfield was performing complete operations upon the nasal accessory sinuses and instituting those principles of sinus surgery which are now recognized as the accepted ones. The technique which he advocated called for the complete eradication of all diseased processes, the meticulous removal of the lining mucous membrane of the sinus, whether it was the maxillary, ethmoid, frontal, or sphenoidal sinuses, and the ablation or maintenance of permanent drainage of the sinus cavity. Modern surgery is making more skillful approaches to the sinuses, reducing de-

formities to a minimum, and embellishing the techniques in some of their minor aspects. In 1907, nevertheless, the fundamental principles of sinus surgery were as well recognized and executed by Dr. Canfield as they are by the surgeons of today.

It would appear from our records that the first successful operation for the total extirpation of the larynx for carcinoma was performed in the department in 1911. A number of unsuccessful attempts at laryngectomy followed; the operative mortality remained so high that the operation was finally considered futile and for a period of twelve years was abandoned. It was not until 1923 when the epoch-making technique of Dr. George MacKenty was put into effect at Michigan, that the laryngectomy ceased to be a hazardous operation and became the accepted procedure in the University Hospital for extensive carcinoma of the larynx. This was followed by the laryngofissure or hemilaryngectomy, a procedure now used when practicable and gaining popularity because of its splendid results in early laryngeal cancer, with the minimum cost to the voice. Laryngectomy has become less popular at Michigan because of the good results obtained by fractionated doses of X ray in far advanced carcinoma of the larynx.

The Department of Otolaryngology had only one professor for the first thirteen years of its existence. In 1917 Dr. Albert Carl Furstenberg ('14, '15m) was appointed Acting Assistant Professor and in 1919 was given the title of Assistant Professor of Otolaryngology. In March, 1927, Dr. Furstenberg was promoted to the rank of Associate Professor of Otolaryngology, which position he held for the succeeding five years.

On May 12, 1932, the tragic death of Dr. Canfield in an automobile accident brought to a close the colorful and extraordinary career of a great savant of

medical science. At the June meeting of the Board of Regents in the same year, Dr. Furstenberg was made Professor of Otolaryngology and succeeded Canfield as head of the Department of Otolaryngology, which position he still retains.

After the completion of University Hospital in 1925 the Department of Otolaryngology was transferred to the new building, and the adequate and improved facilities for the handling of patients brought a corresponding increase in the number of clinic patients seeking otolaryngological consultations. This Hospital met a very urgent departmental need. The otolaryngological service immediately acquired a larger personnel, and the physical handicaps and mechanical difficulties in the old building which had seriously impaired the growth of the department were rapidly eliminated. In 1933 James Hoyt Maxwell ('24, '27m) was appointed Assistant Professor in Otolaryngology. Dr. Maxwell had grown up in the service of the Hospital, having completed his rotation internship in 1928. He became Associate Professor in 1940. His splendid attainments in clinical medicine, his conscientious devotion to the Medical School, and his accomplishments in pedagogy and research brought him rapid promotion to the position of responsibility which he now holds in the Department of Otolaryngology.

In 1932 the University was the recipient of the Roy Bishop Canfield Memorial Fellowship in Otolaryngology, established by Mrs. Leila M. Canfield in

memory of her husband. The munificent benefaction, amounting to the sum of thirty-five thousand dollars, was established as an endowment, "the interest therefrom [to] be awarded to young men, physically and mentally equipped, but perhaps financially unable, to carry on, with honor, work in this special field." It was further specified that appointees to this fellowship must be "young men, not only of ability, but of such sincerity of purpose, and of effort, that they will uphold the high standards to which Dr. Canfield pledged himself" (*R.P.*, 1932-36, p. 34).

Since 1930 the department has actively furthered postgraduate instruction. An annual course is conducted for physicians from various parts of the country. The postgraduate curriculum is not designed for the purpose of training doctors in this special field; it merely aims to refresh the specialist by bringing to him each year some of the newer studies and techniques. This instruction, given in conjunction with the Department of Ophthalmology, has been enthusiastically received by the members of the various classes, and each year requests for registrations exceed the capacity for instruction in this feature of the academic program. In addition to a brief and rapid review of new achievements in the field, the student engages in anatomical studies and serial courses in pathology, all designed to equip him with a working knowledge of these important basic sciences and to furnish him with current clinical information.

A. C. FURSTENBERG

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THE DEPARTMENT OF PATHOLOGY

THE early history of the Department of Pathology reflects the economy in personnel which existed throughout the University. Pathology was included in the plan of teaching at the birth of the Medical School, but of necessity the responsibility for this function was combined with a similar relationship to one or several other branches of medicine.

For the greater part, the history of the department can be written around the men who have borne the title of Professor of Pathology. Only three of them have not been concomitantly titular heads of other departments.

On January 10, 1850, Dr. Jonathan Adams Allen (Middlebury '45, M.D. Castleton Medical College '46) became Professor of Pathology and Physiology, but dissension developed in the faculty and Allen lost the support of his colleagues, who petitioned for his dismissal. Such action was taken by the Regents, and Allen's services to the University terminated on June 30, 1854.

Samuel Denton (M.D. Castleton Medical College '25) had been present at the first meeting of the Board of Regents, June 5, 1837, and he had served on numerous committees concerned with the establishment of the University in Ann Arbor and with the development of the physical aspects of the University. He was also a member of the first Committee on Professors and Salaries. During the winter of 1849-50, the appoint-

ment of Dr. Denton to a professorship in the Medical School had been proposed, and the physicians of Jackson submitted a petition in support of this proposal. Accordingly, in 1850 Denton was appointed Professor of Physic. Shortly thereafter came the dismissal of Allen and apparently his duties, so far as they concerned pathology, were taken over by Denton. No minute to this effect appears in the *Proceedings* of the Regents, but it seems to have been customary during that period for the professors in the Medical School to apportion actual teaching responsibilities among themselves without too strict regard for the implications of their academic titles. That the professorship of pathology had been assigned to Denton in fact, is made certain by an item in the *Proceedings* of the Regents, September 11, 1860: "The President formally announced the decease of Dr. Samuel Denton, Professor of the Theory and Practice of Medicine and of Pathology." Dr. Denton had died on August 17, 1860.

On September 12, 1860, Alonzo Benjamin Palmer (M.D. College of Physicians and Surgeons [West. Dist. N. Y.] '39, A.M. hon. Nashville '55, LL.D. Michigan '81) was transferred to the chair made vacant by the death of Dr. Denton. Dr. Palmer's services to the Medical Department in other capacities had been continuous since October 1, 1854. In fact, he had been appointed Professor of Anatomy in 1852, but could not be called

to duty at that time, apparently because of lack of funds. He had been Professor of *Materia Medica*, Therapeutics, and Diseases of Women and Children since 1854. His connection with the Department of Pathology is to be dated from September, 1860, but it seems probable that someone discovered that Denton's title in respect to pathology had never been established by the Regents, for on March 28, 1861, Palmer's title was amended to "Professor of Theory and Practice of Medicine and Pathology." For twenty-seven years, and until his death on December 23, 1887, Palmer served with marked success in this dual capacity.

No biographical sketch of Palmer is included here, for his history belongs much more to Internal Medicine than to Pathology. (See also C. L. Ford's scholarly account of his life and work.)

Some of the activities of the Department of Pathology during Palmer's time may be surmised from references in the announcements and catalogues (*Calendar*) of the School. Beginning with that of 1863, reference was made to pathological specimens in the Museum. In the catalogue for 1866, there was a list of recommended textbooks in pathology, which included Paget, Rokitsansky, and Simon. Virchow was added to this list beginning with 1872-73. The examination of tissue materials and pathological analysis were mentioned in 1874-75, but under the newly established, short-lived unit which was designated "the Polytechnic School." The first reference to teaching microscopical pathology appeared in the catalogue for 1877-78, when, with the introduction of the three-year graded curriculum in medicine, "Pathology (including Pathological Anatomy and Pathological Histology)" was listed among the courses of the second year. In 1882-83 twenty to thirty microscopes were available for an

advanced course in normal and pathological histology. This was an optional course, like that described in the catalogue of 1886-87: "A special course in the Pathological Laboratory, lasting from 12-15 weeks, is offered to all students who have become sufficiently familiar with normal histology and the use of the microscope."

Several assistants to Palmer in his dual capacity are listed in the catalogues of his period. In 1878-79, Lucian G. North ('77m) was included in the faculty with the title of Assistant to the Professor of Pathology and Practice of Medicine and Clerk of the Faculty. The following year Edward Wirt Lamoreaux ('79m) was Assistant to the Professor of Pathology; and in the catalogue of 1880-81, this position is listed as held by Patrick Eugene Nagle ('80m). In the next year, William J. Herdman ('72, '75m, LL.D. Nashville '97), was Assistant Professor of Pathological Anatomy and Demonstrator of Anatomy, with Charles F. Dight ('79m) Assistant to the Professor of Pathology. Dight continued as Assistant for the next year, but Herdman's title was changed to "Professor of Pathological and Surgical Anatomy, and Demonstrator of Anatomy." In 1883-84 there was further modification to "Professor of Practical and Pathological Anatomy, and Demonstrator of Anatomy." In that year, Osbourne F. Chadbourne (83m) became Assistant to the Professor of Pathology. Herdman and Chadbourne continued in these positions through 1886-87, when Joshua S. Blanchard ('81m) was made Assistant.

HENEAGE GIBBES.—In 1888, shortly after the death of Alonzo B. Palmer, who had held the joint title of Professor of Pathology and of Practice of Medicine, Heneage Gibbes (M.B. and C.M. Aberdeen '79, M.D. *ibid.* '81) became the first to fill an independent chair of

pathology in this University. The medical faculty, in a resolution of October, 1887, had urged the establishment of such a chair and had requested that instruction in the subject "should be largely given as laboratory work." Dr. Gibbes was born in Berrow, Somerset, England. His father, a minister, was the grandson of Sir G. S. Gibbes, M.D., F.R.S., who had been physician to Queen Charlotte. It is said that the Reverend Gibbes had intended that his son should prepare for the ministry, but the boy rebelled and at fourteen sailed for the East Indies instead. A period of adventurous living followed, which furnished the material for many tales of the Opium War, of combats with pirates, of shipwreck, and of commanding his own ship at twenty-one.

He then returned home, resumed his studies under private tutors, and completed his education at the University of Aberdeen. In 1879 he became a licentiate of the Royal College of Physicians. In England and in governmental service in India, Gibbes had a varied and interesting career. He was curator of the Anatomical Museum of King's College and lecturer in physiology and normal and morbid histology in Westminster Medical School, both of London, and in 1884 he was sent to India as cholera commissioner for the British government. As a student of Klein and as a well-established histologist, it was natural that he should be chosen to accompany Klein on this mission.

When Gibbes came to Ann Arbor he brought with him very definite views as to the nature of bacteria and their significance in the production of disease. These views he did not hesitate to express forcefully even after it was evident that they were unwelcome to his colleagues and were not in harmony with current advances in the field of bacteriology. In 1888 he told the Michigan

State Medical Society that phthisis and tuberculosis were distinct diseases and that the tubercle bacillus had not yet been proved to have any causal relation to either, but "would seem to be a concomitant of the process of caseation." He recognized the presence of bacteria in tissues and devised and taught methods for staining them, but he thought that such organisms were present because tissues altered by disease were suitable soil for their growth and that no specific etiological relationship existed. This was a period of rapid progress in bacteriology, and his colleagues were keenly sympathetic to the changing order. Some of them were having a very important share in the demonstration of living organisms as specific causes of disease. Thus, the gap widened, and differences in point of view became more obvious. In defense of Gibbes it should be remembered that he had written freely while yet in England. His views could have been easily ascertained and probably were already well known to some members of the faculty before he was offered a chair in this University.

The discord which characterized Gibbes's tenure and the great success which Warthin achieved when, after a short interlude, he became head of the Department of Pathology have combined to belittle the work of Heneage Gibbes. While in England he had written many papers on histology, most of which appeared in the *Quarterly Journal of Microscopical Science*. He had also published a textbook, *Practical Histology and Pathology*, which ran through several editions both there and in America. While he retained his professorship in this University, he contributed more than twenty additional articles to medical journals. Although the topics on which he wrote were widely scattered in the general field of pathology, those selected for special study were so well

chosen that in regard to most of them there has been well-sustained interest even to the present time. Tuberculosis, cancer, pneumonia, the hemolymph nodes, and actinomycosis appear most frequently among the titles of his papers.

It is difficult to appraise the teaching of pathology during Gibbs's professorship. The microscope was still a comparatively new aid in uncovering the processes of disease. It has been said that there was no course in microscopical pathology worthy of the name until Dr. Warthin organized one in 1895-96. As has been stated, however, an elective course of this nature was offered before Gibbs came and was continued during the earlier years when he headed the department. Moreover, beginning with 1891-92 it became a required course for all students. It is scarcely credible that one who wrote as extensively and as accurately on many phases of histology and histopathology as did Gibbs and who had had such interesting experiences in distant lands could not have given a worth-while course. Memories of success in teaching were clouded by the controversies of the period and finally by the scientifically unsound position of the teacher. Only recently, however, one who was a student of Gibbs in Detroit, Dr. William Fowler, has written appreciatively of the teaching he received from him:

I had the fortune to take a special course in Pathology from him [Gibbs] and he was a fine teacher. Pathology was a comparatively new subject and here was a man who claimed much for it . . . Shortly before the death of Doctor Gibbs, I spent a very pleasant afternoon with him in his home at McAllister [McAlester], Oklahoma, and it was only then that I learned that beneath a Scottish-Cockney exterior was a charming character, subdued, cultured, sympathetic, companionable and inspiring. (*Journ. Mich. State Med. Soc.*, 40 [1941]: 678.)

Heneage Gibbs continued as Professor of Pathology until 1895. Shortly thereafter he removed to Detroit, where he became professor of the theory and practice of medicine and of pathology in the Michigan College of Medicine, and also city health officer. He died on July 18, 1912.

In the catalogue of 1887-88, the year in which Heneage Gibbs was chosen to fill the vacancy in the chair of pathology due to the death of Dr. Palmer, William J. Herdman was continued as Professor of Pathological and Surgical Anatomy, and Demonstrator of Anatomy; and Joshua S. Blanchard appeared as Assistant to the Professor of Pathology and the Practice of Medicine and Clinical Medicine. In the following year no assistants to Gibbs were listed. It is evident that the first Professor of Pathology to be unhampered by duties in other departments was expected to do alone everything needed in pathology. Provision for this independent professorship may have left no funds with which to pay assistants. In 1889-90, Vida A. Latham ('92d, M.D. Northwestern '95) was Assistant in Pathology, Arthur S. Rogers ('85p, '90m), in 1890-91, and Martin L. Belser ('91m), in 1891-92. Belser was Instructor in Pathology from 1892 to 1895.

Changes in methods of teaching and expansion of departmental activities are indicated by brief references in the annual catalogues. The first description of the Pathological Laboratory appeared in 1888-89. The microscopes were made by R. and J. Beck of London. The staining and detection of bacteria were included in the procedures taught. Zeigler's *General Pathology* and, in the following year, Gibbs's *Practical Histology and Pathology* were added to the list of recommended textbooks. The elementary laboratory course was required of all students in 1891-92, and autopsies were done before

the senior class with selected students assisting. A graduate course in pathology, including microscopical technical methods, was described in 1892-93. In the following year two hours per week were devoted to pathological histology. The detailed program for 1894-95 assigned sixty-four hours of lectures in General Pathology to Gibbes; Gibbes and Belser together gave sixteen hours of lectures, fifty hours of laboratory work, and twenty-eight hours of microscopical demonstrations in Pathological Histology, and each student received three hours of Autopsy Demonstrations.

ALDRED SCOTT WARTHIN.—With the departure of Heneage Gibbes in 1895, George Dock (M.D. Pennsylvania '84, A.M. hon. Harvard '95, Sc.D. hon. Pennsylvania '04) was placed in charge of pathology, and his title was expanded to read "Professor of Theory and Practice of Medicine and Clinical Medicine and Pathology." Dr. Dock had been at the head of the Department of the Theory and Practice of Medicine since 1891, and the addition of pathology to his responsibilities was a restoration of the arrangement which existed before Gibbes was appointed. Dock was well fitted for this assignment for he had been professor of pathology at Texas Medical College and Hospital before coming to Michigan, but he was much too busy to carry this added work alone. Fortunately, he had on his staff a young man whose personal attributes and professional training made him peculiarly fitted for transfer to pathology.

Aldred Scott Warthin (Indiana '88, Michigan '91m, Ph.D. *ibid.* '93, LL.D. Indiana '28) was born at Greensburg, Indiana, October 21, 1866, and died at Ann Arbor, May 23, 1931. He received a Teacher's Diploma in Music from the Cincinnati Conservatory in 1887. The subject of his doctoral thesis was "The Value of Music as a Dramatic Element."

He had been assistant to Dock in 1891-92 and Demonstrator of Clinical Medicine from 1892 to 1895. He had given special attention to microscopy in medical diagnosis, and each summer found him in Europe acquiring the rapidly increasing knowledge of tissue diagnosis as it was then being developed in Germany and Austria. It was natural, therefore, for Dock to place Warthin in immediate charge of his newly acquired responsibility. Thus, in 1895 Warthin became Instructor in Pathology. Dock delivered the lectures on general pathology until 1899, when Warthin was advanced to the assistant professorship, and nominally held the professorship for four years more. In 1900 the basic laboratory course was lengthened to nine weeks, with 135 hours of work. On request of the medical faculty Warthin was, in 1903, made Professor of Pathology and Director of the Pathological Laboratory.

Warthin was extremely productive in research and was a frequent contributor to medical journals. Even a partial list of the topics on which he wrote reveals the breadth of his interests. Only the more important works can be mentioned here. While yet a demonstrator in the Department of Internal Medicine, he described the accentuation of the pulmonary second sound in pericarditis and assigned diagnostic significance to this clinical manifestation, which has since been known as "Warthin's sign." Tuberculosis of the placenta, the histology and pathology of the hemolymph nodes, the generic relationship of the leukemias, Hodgkin's disease, and lymphosarcoma, the pathology of irradiation, traumatic lipemia, the lesions produced by dichloroethylsulfide (mustard gas), and the constitutional pathology of hyperthyroidism are some of the subjects to which he made important contributions. It is for his work on the pathology of latent

syphilis, however, that Warthin is best known. Interested first in the lesions of congenital syphilis, he early recognized that the histopathological manifestations of syphilis exhibit an essential unity in various organs and at various stages of the disease. In a series of some forty papers he established a new conception of the pathology of late, and of latent, syphilis, particularly in the heart, aorta, pancreas, adrenals, and testes. Making use of new techniques in staining, developed in association with Allen C. Starry, Richard E. Olsen, and Robert Farrier, he was able to support his views of this disease process by the demonstration of *Treponema pallidum* in lesions in which it had never before been seen.

For many years medical students used Dr. Warthin's translations and revisions of the tenth and eleventh editions of Ziegler's *General Pathology* as well as his own *Practical Pathology* and *Autopsy Protocols*. In the later years of his life his writings reflected to a greater extent his interest in the cultural and philosophical aspects of medicine. During this period he brought out three books: *Old Age* (1929), *The Creed of a Biologist* (1930), and *The Physician of the Dance of Death* (1931).

Warthin held office in many of the societies in the fields of medical biology, pathology, and internal medicine of which he was a member. He was president of the American Association of Pathologists and Bacteriologists in 1908, of the International Association of Medical Museums from 1910 to 1913, of the American Society for Experimental Pathology in 1924, of the American Association for Cancer Research and of the Association of American Physicians in 1928, and of the American Association of the History of Medicine in 1930-31.

Warthin, in collaboration with Dr. M. E. Abbott and others, edited the *Bulletin of the International Association*

of Medical Museums (1911-31), the *Annals of Clinical Medicine* (1924-27), and the *Annals of Internal Medicine* (1927-31).

Untiring energy, broad cultural attainments, personal fastidiousness, and unswerving loyalty to his chosen interests were Warthin's prominent traits. He was a vigorous and outspoken proponent of that which he believed to be right. Thus, he made many enemies as well as many friends. Students considered him a hard taskmaster, and those who had little personal contact with him generally disliked him. To the individual student, however, he was always ready to give sympathetic encouragement, and his friendly and understanding attitude toward the individual was in sharp contrast to the pedagogical pressure which he put upon his students en masse. He was fully aware of the feeling of the average student toward him and frequently reacted with the statement that he was quite willing that the students should swear at him while here, if they would swear by him after they were out in the practice of medicine. This hope was amply realized, and many who had been outspoken in adverse criticism as students, returned to voice their appreciation and to assert that from pathology, more than from any other one department, they had gained the knowledge which enabled them to succeed in practice.

Between 1903 and 1931 all junior work in general pathology was transferred to the preclinical years, the required autopsy work was greatly increased, specialized undergraduate courses were introduced, an expanded summer program was established, and an ambitious program of research and of extramural service was carried out.

ACTIVITIES IN CONNECTION WITH WORLD WAR I.—The teaching load of the Department of Pathology was prac-

tically doubled during the period of American participation in World War I. Classes were greatly increased in size, and the curriculum was compressed in order to prepare young medical men for military service as rapidly as possible. Physical changes in the department also were required, and the old arrangement of tables in the main teaching laboratory (West Medical Building, Room 104) gave way, during the year 1917-18, to a more practical, if less interesting, floor plan, which doubled the number of working places. (This seemingly minor point would scarcely deserve mention were it not for the fact that as the older alumni return, they are puzzled by the unfamiliar appearance of the room which had impressed upon many their most vivid recollections of the Medical Building.) A special course, "Pathology in Relation to Military Medicine," was offered during this period and proved both popular and useful.

The War Retrospect Section of Bulletin VII of the International Association of Medical Museums, edited by A. S. Warthin and C. V. Weller during the year 1917-18, contained twenty-four articles on the special pathology of morbid conditions of military importance. Eight of these were written by Warthin; Weller was responsible for a comprehensive survey of the "Pathology of Gassing," with a complete bibliography of the medical aspects of military gassing up to that time.

This was also a period of intense research activity. Through the kindness and skill of Dr. Moses Gomberg, of the Department of Organic Chemistry of the University, a supply of pure liquid mustard gas (dichlorethylsulfide) was made available long before this potent war gas was under factory production in this country. With this pure product, and, later, with commercial mustard gas provided by the Dow Chemical Com-

pany of Midland, Michigan, every possible phase of the pathological effects of mustard gassing was investigated. Dr. George Herrmann assisted Warthin and Weller in this work and was primarily responsible for the clinical investigation of human cases of mustard gassing which became available. The results appeared in six papers published in the *Journal of Laboratory and Clinical Medicine* in 1918. The first study was published independently, but shortly thereafter the Pathological Laboratory became allied, through its director, with the Medical Advisory Board of the Chemical Warfare Service and had the status of a branch laboratory. The remaining investigations were given that board, appeared in abstract in its bulletins, and were later released by the board for publication in full. To meet the demand for this material for medical officers of the Army and others, it was brought out in book form. It also was utilized in *The Medical Department of the United States Army in the World War*, Vol. XIV, Chap. XV. This chapter, prepared by Warthin, is entitled "Pathologic Action of Mustard Gas (Dichlorethylsulfide)."

The Aldred Scott Warthin Anniversary Volume. In recognition of his thirty-five years of teaching in the Medical School of the University, and of his international reputation in pathology, a *Festschrift* was planned in honor of Dr. Warthin's sixtieth birthday, October 21, 1927. This book included scientific contributions from sixty-four authors, among whom Vaughan, Dock, Novy, Huber, and Rous represented his early colleagues, while each of the thirty-five classes taught by Warthin was represented by articles written by one or more of its members. The editorial work on this volume was done by Willard J. Stone, of Pasadena, and Carl V. Weller, of Ann Arbor. Formal presentation of this volume was made December 13, 1927, in the

West Amphitheater of the West Medical Building. After a short address by Dean Hugh Cabot, the presentation was made by Frederick Novy.

On June 15, 1935, the Aldred Scott Warthin Memorial Plaque, a bronze bas-relief of Warthin, was unveiled in the east lobby of the West Medical Building. This was presented to the University by those who had served under Warthin as undergraduate or graduate members of the Department of Pathology staff. Of this group, seventy-eight contributed to the fund which made this plaque possible. It was modeled by Fredrika Godwin Mallette, of Ypsilanti. At the presentation exercises Dr. Howard H. Cummings represented the department staff, Dean Albert C. Furstenberg accepted on behalf of the Medical School, and President Ruthven on behalf of the Regents of the University.

In 1935-36 the executive staff of the University Hospital directed that the space for museum purposes in the Department of Pathology of the University Hospital be designated the Aldred Scott Warthin Museum of Pathology. Through Dr. Harley A. Haynes, Director of the University Hospital, a bronze tablet, carrying this designation, was provided and installed.

Until 1899-1900, Warthin had no aid in the teaching of pathology. In that year Frederick Amos Baldwin ('98m, '02, Sc.D. '04) was appointed Assistant in Pathology. He continued at this rank until he was made Instructor in Pathology in 1903-4. This position was unfilled in the faculty list for 1904-5. Elmore Ernest Butterfield (M.D. Columbian '03) was Instructor in 1905-6; Francis Peyton Rous (Johns Hopkins '00, M.D. *ibid.* '05, Sc.D. hon. Michigan '38, Sc.D. hon. Cambridge '38), from 1906-8; Robert Livingston Dixon (Tri-State '96, Michigan '10m), in 1908-9 and also in 1910-11,

and Plinn Frederick Morse ('07, '09m, A.M. '10), in 1909-10. For a time, members of the staff of the Department of Gynecology and Obstetrics assisted in the diagnosis and teaching of gynecologic pathology. Those assisting in this way were Ralph L. Morse, 1902-4; Samuel R. Haythorn, 1904-5; Frank Clarence Witter, 1906-8; Neal Naramore Wood, 1908-9.

Carl Vernon Weller (Albion '08, Michigan '13m, M.S. *ibid.* '16) joined the staff as Instructor in Pathology in 1911, was made an Assistant Professor in 1916, Associate Professor in 1921, Professor of Pathology and Assistant Director of the Pathological Laboratories in 1924.

For many years much of the routine histological work was done by student volunteers of the junior staff. The first salaried technician was Ellery Adolph Schmidt, who was appointed in 1908.

Prior to 1922, the departmental janitor assisted in the autopsy room and in the general work of the laboratory. This arrangement was heartily disapproved by the Buildings and Grounds Department, and in 1922 a laboratory attendant, known still as a "Diener," was engaged in the person of John Henry Robinson. With his abundant snow-white hair and dignified bearing, Robinson added significantly to the atmosphere of the department during his fourteen years of loyal service.

With the growth of the department, the number of research and teaching assistants, of technicians, and of clerical workers rapidly increased. To name each of them is beyond the scope of this article. Their names are in the announcements of the Medical School. Only those who served as instructors or in the professorial ranks can be mentioned specifically for the later years. This is unfortunate, for among the lower staff were many who here, or elsewhere, have attained distinction in pathology or in

one of the clinical branches of medicine.

Harriet Shourds Taylor (M.D. Hering Medical College '97) joined the staff of the Department of Pathology as Research Assistant in 1918-19. She returned in 1921-22 as Assistant Professor in Dental Pathology and held the title of Assistant Professor of Pathology for three years thereafter. Walter M. Simpson (B.S. Med. '22, M.S., '24, '24*m*), a student teaching assistant in 1923-24, became Instructor the following year and was succeeded in 1927 by Carl Hale Fortune (Transylvania '22, Michigan '26*m*), who remained until 1930.

From 1922 to 1924 Ruth C. Wanstrom ('14, '18*m*, A.M. '24) was Research Assistant in Pathology under a special grant for the investigation of syphilis. She continued in this work during the following year, when she was advanced to Assistant Professor. In 1931 she returned to the department and in 1937 was made Associate Professor in Pathology.

John C. Bugher ('21, '29*m*, M.S. '32) was made Instructor in 1930 and was advanced to Assistant Professor in 1933. He resigned in 1937 to accept a position with the International Health Division of the Rockefeller Foundation, in which position he directed a research laboratory and field work for the control of yellow fever in Colombia, with headquarters in Bogota.

CARL V. WELLER.—In June, 1931, Weller was made Director of the Pathological Laboratories and was placed in charge of the department. In a standardization of the titles of similar faculty positions seven years later, his title was changed to Professor of Pathology and Chairman of the Department of Pathology.

Harold Gordon (M.D. Toronto '33, M.S. Michigan '34) had been associated with the department for two years as a teaching assistant when he was appointed Instructor in 1932. He continued

in this capacity for three years, when he resigned to become associate professor of pathology in the University of Louisville.

Lloyd Fullenwider Catron (B.S. Med. '29, M.D. Rush Medical College '32) was appointed Instructor in Pathology in 1935 and Assistant Professor in 1937. His service was continuous from his first appointment until his resignation in 1941 to assume directorship of the laboratories of the Akron City Hospital.

Robert J. Parsons (Syracuse '28, M.D. *ibid.* '32) joined the staff of the department as Instructor in 1938, and was advanced to Assistant Professor in 1941. Before coming to Michigan he had been for three years assistant in the Department of Pathology and Bacteriology at the Rockefeller Institute for Medical Research.

JUNIOR STAFF AND JOURNAL CLUB.—About 1896 Dr. Warthin began to select groups of eight to ten junior medical students on the basis of scholarship as members of the Junior Staff and Journal Club. This group met twice a month, usually at Warthin's home. Papers on the history of medicine and sometimes on simple research problems were presented by members of the club. Membership in the club was greatly appreciated by students, but it also entailed much hard work, for to these students was assigned the preparation of microscopic sections from the material from the clinics of the University Hospital. Eventually, the clinical material became so extensive that students no longer had time to do the work. During the accelerated activities of World War I, the junior staff had to be abandoned and was never re-established.

PHYSICAL GROWTH.—When Heneage Gibbs came to Ann Arbor as the first Professor of Pathology (as an entirely independent chair) he was given working space in the basement of the small new

Anatomical Laboratory Building. This was soon outgrown and the laboratory of pathology was established in the central part of the long, low building on the north side of the campus which was largely occupied by the Homeopathic Medical School and Hospital and which was known for years as the "old" Hospital. It was here that Warthin began his laboratory teaching of pathology. The interior of this laboratory is shown in a picture of the Pathology Staff and Journal Club of 1898-99 in the *Aldred Scott Warthin Anniversary Volume* (p. 116). Pathology was never taught in the original Medical Building which faced East University Avenue where the Randall Laboratory of Physics now stands.

In the new building (1903) now designated the West Medical Building, comparatively generous provision was made for pathology. The more easterly of the two amphitheatres was equipped for the performance of necropsies, and a large room in the southeast corner was arranged as the Pathology Museum. Offices, laboratories, animal rooms, and storerooms occupied the remainder of the east half of the first floor and a part of the east half of the basement.

In 1926 the completion of the East Medical Building made possible the removal of three departments from the older building and the Department of Pathology acquired the basement space and the east half of the second floor, which had been used for work in anatomy and histology. Half of the one-story addition, which had been built in the central court as an overflow anatomical laboratory during World War I, became a satisfactory animal room. This expansion relieved the crowded condition created by the necessity of adding both lectures and laboratory instruction for dental students in separate classes, and by the great increase in graduate students.

Prior to 1926, bodies upon which necropsies were to be performed were transported from the Hospital to the Medical Building on the campus. All surgical specimens, also, were carried to the Medical Building. Under this plan the essential services of the Department of Pathology to the clinical units at the Hospital were rendered with great difficulty and with many opportunities for confusion and delay. Immediate frozen section diagnoses, while the patient was under anesthesia, were almost impossible. With the completion of the Hospital in 1925, the department moved into space well arranged for its needs on the subbasement floor of the surgical wing. In spite of the "subbasement" designation, these new laboratories were above the ground level. A large museum room, staff offices, a necropsy amphitheater, and numerous laboratories for technicians were provided. Most of the corresponding area of the sub-subbasement floor was equipped for storage of prepared microscopical sections and of paraffin blocks. The first necropsy in the Hospital amphitheater was performed by Dr. Warthin on February 9, 1926. This was No. 2045, A-147-AD.

At the Hospital no provision had been made for teaching sophomore medical students, dental students, or graduate students. Accordingly, space on the old campus was retained and gradually remodeled in order to meet special needs as they arose. Technical staffs were maintained both on the campus and at the Hospital. Between them the work of the department was divided on the principle that all material originating in the Hospital (necropsies and surgical specimens) was to be examined there, while all other material (surgical specimens from the Health Service and College of Dentistry, specimens from outside hospitals and physicians, and all research material) was to be prepared and

examined in the West Medical laboratory.

In 1938-39 the Neuropsychiatric Institute was constructed. To secure physical continuity with the main Hospital, it was necessary to cover the skylight which provided the only natural lighting for the necropsy amphitheater. Although retained as a lecture room, with its table left for the teaching of autopsy technique, the amphitheater could no longer be used for routine necropsies and was replaced by a more convenient room with two tables, providing more intimate instruction for smaller groups.

CONSULTATION SERVICE IN TISSUE DIAGNOSIS.—Physicians of Michigan, and, to a lesser extent, those of neighboring states, have looked to the Department of Pathology for diagnostic aid and for consultation service in tissue pathology. This was a natural and legitimate demand, since the services of pathologists have not been locally available. During the period in which Warthin was Director the demand for tissue diagnosis grew rapidly. From an occasional case in the early years, by 1928-29 the volume of this material had increased until it exceeded ten thousand cases per year, and more than six hundred physicians were making use of the consultation service.

In May, 1932, the Regents recognized this diagnostic service as a University function and adopted regulations for its operation. A Pathology Diagnostic Revolving Fund was established to facilitate the handling of financial matters in connection with this work. In June, 1937, the Regents authorized the transfer of the accumulated balance in the Pathology Diagnostic Revolving Fund to the Pathology Endowment Fund and provided that similar transfers could be made from time to time as circumstances might warrant. This has been done, and thus, through the use of the facilities of the laboratory for an essential public

service, a permanent endowment for the department is being established.

To the nonmedical reader, the significance of this work may not immediately appear. Many of the tissues examined in the laboratory are "surgical biopsies," which have been removed by a minor procedure in order to obtain a more accurate diagnosis and thus gain information upon which further treatment may be undertaken and the ultimate prognosis gauged. Frequently, the clinical question is that of the presence or absence of cancer. For many years, it has been a departmental aim to make such tissue diagnoses available to every citizen of Michigan at a nominal cost. This has been accomplished without prejudice to private endeavor in the field of professional pathology. In fact, most of the pathologists in the state owe their positions to the fact that the Department of Pathology had taught the value of routine tissue examinations to the local physicians. Whenever a local hospital reaches a size which justifies the employment of a resident pathologist, the University assists in making the necessary arrangements and frequently sees one of its own graduate students installed. As the larger hospitals advance to this level, smaller institutions are added to the list of those which the University serves. Thus, the Department of Pathology continues to influence the practice of medicine over the state and to serve the citizens of the state.

RESEARCH ACTIVITIES.—As a matter of departmental policy each member of the professional staff has been expected to maintain a continuous program of research, with emphasis upon study and investigation rather than upon publication. Under this plan, and in spite of the routine service responsibilities of the department, there has been a fairly constant stream of contributions to medical periodical literature and to various

handbooks. Those investigations which have been concerned with morphological pathology have very largely had origin in the routine diagnostic material, and this has been partly true of research in experimental pathology.

Grants from extramural sources have supported some of the more ambitious research programs. Among the more important grants have been those from the Pease Laboratories, Inc., for investigation of the toxicity of aluminum compounds, from the Committee on Research in Syphilis, Inc., in support of studies on the lesions of latent syphilis and on the demonstration of spirochetes in tissues, from the American Medical Association for a study of the fish tapeworm (*Diphyllobothrium latum*) in the Great Lakes region, and from the A. C. Barnes Company, Inc., for an investigation of argyria.

Three doctoral dissertations had been presented from the Department of Pathology by the end of June, 1940:

George R. Herrmann, "Electrocardiography and Cardiac Pathology with Especial Reference to Ventricular Preponderance," 1921-22.

Richard E. Olsen, "A Study of the Granular and Atypical Forms of Spirochaeta Pallida in Tissues," 1930-31.

Frank P. Mathews, "An Experimental Investigation of Lechuguilla (*Agave lechuguilla*) Poisoning," 1936-37.

Twenty-nine students had also received master's degrees in pathology from this department by 1940.

In 1902 reprints of all papers which had been published from the Department of Pathology since Warthin had joined the staff were bound as Volume I of a series entitled *Contributions from the Pathological Laboratory*. Subsequent volumes have appeared at irregular intervals as material has been available. Volume XIX contains the papers which were published in the period 1937 to

1940. Copies are distributed to the more important medical libraries over the world and also to other pathological institutes in exchange for their own contributions.

INSTITUTE FOR LAW-ENFORCEMENT OFFICERS.—As might well be expected, those public officials who are charged with responsibility for the investigation and prosecution of criminal acts have frequently sought the aid of the staff of the Department of Pathology and have called on them to perform necropsies, to secure materials for submission to toxicologists, and to make microscopical examinations and photomicrographs of human tissue, and of objects thought to have possible evidential value. In addition, the staff has almost constantly acted in an advisory capacity, in medical matters, with the State Police and other official agencies. Thus, the staff of the Pathological Laboratories has been concerned in the investigation of many notorious homicides in this state.

As the value of scientific technology in the study of crime became more apparent to public officials, there developed a demand for instruction in this field with requests from individual judiciary and police officers reinforced by formal resolutions of various organizations. In March and April, 1934, the first Institute for Law-Enforcement Officers, organized under the auspices of the Extension Service of the University, was held in the East Amphitheater of the West Medical Building. A program of sixteen lectures and four discussion periods was provided. Professor O. W. Stephenson, of the Department of Education, and Dr. Herbert W. Emerson, of the Hygienic Laboratory, aided in the organization of this and the succeeding institutes, which were held in 1935 and 1936. Detailed programs with the personnel of the committees in charge were printed. With the development of increased

facilities for instruction in East Lansing by the State Police and with the growth of the school organized by the Federal

Bureau of Investigation, it was decided in 1937 to discontinue the institutes

CARL V. WELLER

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THE DEPARTMENT OF PEDIATRICS AND INFECTIOUS DISEASES

THE first regular course in pediatrics¹ in the Medical School was given in the year 1905-6 by Dr. David Murray Cowie ('96m), who had been appointed Instructor in Pediatrics in the Department of Internal Medicine. Prior to this time, however, the subject of children's diseases had not been neglected. It was included in the course on the Theory and Practice of Medicine. The title of Dr. Alonzo Benjamin Palmer (M.D. College of Physicians and Surgeons [West. Dist., N. Y.] '39, A.M. hon. Nashville '55, LL.D. Michigan '81) in 1854 was Professor of Materia Medica, Therapeutics, and Diseases of Women and Children. This was later changed, on the death of Dr. Samuel Denton (M.D. Castleton Medical College [Vt.] '25) in 1860, to Professor of Pathology, of Materia Medica, and of the Theory and Practice of Medicine. His successor, Dr. Henry Francis LeHunte Lyster ('58, '60m, A.M. '61) was Professor of Theory and Practice of Medicine and Clinical Medicine from 1888 to 1890; but up to this time no emphasis had been placed on diseases of children. There is no mention of children or infancy in the index of the two 900-page volumes of Palmer's excellent and then very popular text, *The Science and Practice of Medicine*. It is noteworthy that Dr. Walter Shield Christopher, who followed Dr. Lyster, was a pediatrician, and in his courses on internal medicine, he must have more or less continuously pointed out the differences between childhood and adult types of disease. It was his interest in pediatrics that led Dr. Christopher to resign his chair at the University in 1891 and

to take up the practice of that specialty in Chicago, where he became professor of diseases of children at the Chicago Polyclinic.

After graduating from the Medical College of Ohio in 1883, Dr. Christopher was elected Demonstrator of Chemistry at his alma mater, and consulting chemist to the Rookwood Pottery, where he perfected some of the glazes which have since given world-wide fame to Rookwood ware. Soon after his graduation he was made clinician to the children's clinic of the Medical College of Ohio, in Cincinnati.

Dr. Christopher was elected to membership in the American Pediatric Society in 1889 and served as its president in 1902. He was greatly interested in "the perversions of the chemism of the body," and was one of the first to see the importance of such studies in diseases of infancy: "It is in these conditions of perverted chemism of infancy," he said, "that we find many of the difficulties of infant feeding." Dr. Christopher died in Chicago, March 2, 1905, "one of the best known and best beloved physicians of this country."

In 1891 Dr. George Dock (M.D. Pennsylvania '84, A.M. hon. Harvard '95, Sc.D. hon. Pennsylvania '04) was appointed Professor of Theory and Practice of Medicine. He had been an associate of Osler, and he continued to be an ardent follower and exponent of this great teacher and clinician. Osler was particularly interested in pediatrics and was a member of the American Pediatric Society, being its president in 1896. Medical men of that time were particularly interested in the childhood types of disease, and it should be pointed out that

¹ See footnote 2, page 859.

Dock did not neglect pediatric training while he was abroad. He made every effort to encourage doctors to send sick children to the University Hospital. He taught a simple milk dilution method of infant feeding, which soon went out of vogue, overshadowed as it was by the newly developed "percentage method," but since reinstated with a better understanding and appreciation of its merits. Sterilized and pasteurized milk dilutions, cereal and vegetable additions, yolks of hard-boiled eggs, milk and cane sugar, were all that were needed then as now, if intelligently employed, to carry the infant successfully through the then more perilous period of infancy.

Because of the alarming increase in the infant mortality rate about this time, general interest was aroused in the conservation of infant life. Few medical schools had instituted required courses in the diseases of infancy and childhood, and pressure was being brought to bear on their faculties to establish such courses.

Dr. Cowie was particularly interested in the field of gastroenterology and infectious diseases. When, in 1905, it became advisable to develop the subject of pediatrics as a permanent course in the Medical School, because of the frequency of these two types of disturbance in infancy and childhood, he was selected to teach this branch in addition to his other work. The staff had been trying for several years, without much success, to increase the admission of children to the University Hospital. Parents who could afford to pay for their children's medical attention would, of course, not send them to a charity hospital which possessed no special equipment for their care. There was no state children's fund and no way whereby the indigent medically sick child could enter the hospital unless a cash deposit was made or the child's expense in some way guaranteed.

This was done insofar as possible by the organization of King's Daughters, the Palmer fund, and by private donations. The interest on the Palmer fund amounted to \$750 a year and was used for surgical as well as medical child patients and for some time for the defraying of the expense of glasses for children.

The opportunity to develop a clinic under these conditions was discouraging. A bill had been passed by the legislature some years previously providing hospital care for children with congenital deformities, but the medically or acutely sick child was discriminated against. Only children with certain states of mental deficiency could be admitted to the clinic under this provision. This helped to increase the number of children at the Hospital. Where children are gathered the disturbances to which they are heir sooner or later show themselves, and, developing under the eyes of the staff, they were sooner recognized and more properly handled. The staff, however, began to think that these children, in spite of popular belief to the contrary, were more resistant to the vicissitudes of childhood than those not so afflicted. Medical material for teaching purposes did not perceptibly increase with their attendance, but they proved excellent cases for the study of this ever-increasing and important form of juvenile disturbance. Children with "epilepsy" could also be admitted under the provisions of this act. They are always of great interest and importance as medical problems, and much could be done for them.

There was some technical difficulty in bringing about the establishment of this separate division of internal medicine, since there was already a chair of diseases of women and children, the Bates professorship, first given to Dr. James N. Martin. An adjustment was soon made, and the subject of pediatrics was perma-

nently established as a required course for graduation—one of the first in the United States.

As early as 1902-3 in the description of the Department of Medicine in the yearly *Calendar* there appeared a statement of the teaching of diseases of children: "The peculiarities of medical diseases in childhood are discussed in the lectures and recitations. Clinical instruction is given in the various hours mentioned above. Most of the infants born in the Obstetric Clinic are artificially fed, and furnish abundant material for instruction in this important branch Contagious Diseases are demonstrated in an Isolation Ward." This latter statement was perfectly correct.

In 1901 Mrs. Love M. Palmer, widow of the late Alonzo B. Palmer, made a bequest of \$20,000 to the University for the building of a memorial ward, to be known as the Alonzo B. Palmer Ward. She also established an endowment fund of \$15,000 to be used for the medical care of patients brought there. The building was completed in 1903. It was decided by the Board of Regents to dedicate the ward to the service of children. The urgent need for quarters for obstetrical patients, however, persuaded the Hospital staff, with the permission of the Regents, to use the first floor of the building for that purpose. Another pressing need determined them to use the second and third floor for a nurses' home. Accordingly, there was no special place in which to house the patients of the children's division of clinical medical study.

The children's clinic grew very slowly. The greatest number of yearly registrations during the first eight years was 228 (1912). Much pressure was being brought to bear on the Regents to transfer the clinical years of medical study to Detroit, and the need for more adequate teaching material in pediatrics was being stressed. Dr. Cowie decided to organize

a campaign for a revision of the congenital deformity act (No. 42) of 1897 or for the passing of a new act by the legislature that would permit any indigent sick child in the state who needed medical care to be sent to the University Hospital as a so-called free case. Dr. Peterson, hearing of this, informed Dr. Cowie that he had been thinking of a similar plan for the admittance of pregnant women to the Hospital and requested that he be allowed priority for his plan. Cowie agreed that his was the greater need. The babies born at the Maternity Ward were turned over to the Department of Pediatrics for feeding and medical care (see HOSPITAL, p. 975).

In due time the proposal for the new children's act was revived and pressed with vigor. It was not difficult to secure favorable legislation when the legislators saw the needs. Accordingly, in 1913 the now well-known children's act (No. 274) was established. In Michigan the legislature has always acted wisely in matters pertaining to public health. Michigan stands second to none in devising ways and means for the care of its unfortunate and underprivileged children.

Since the establishment of this law the children's medical clinic has had a phenomenal development. It progressed from twenty-two patients for teaching purposes in the first year, to a yearly registration of 6,346 in 1932 and a monthly attendance of 2,580 in August, 1935.

The new law stipulated that a place should be provided for all children brought to the Hospital by properly authorized agents. The space that could be used for them was soon exhausted, and more beds had to be provided. The Palmer Ward originally had been set aside for the care of children. As arranged, the space assigned to obstetrics became inadequate, and buildings were moved to the hospital grounds to provide better accommodations for the patients of that

clinic. The first floor of Palmer Ward was turned over to the Department of Pediatrics in 1911. This served the need, however, for only a short time. The increasing number of children made it necessary to crowd the wards and the sun porch beyond their capacity.

Finally, the glass-enclosed corridor between the old Surgical Building and Palmer Ward and the one between Palmer Ward and the Medical Ward (destroyed by fire, 1927) had to be filled with beds for children. Their smiles and cries made a great appeal to the passerby. They were a daily reminder that more space had to be provided; in 1913 the nurses' quarters were removed from the second and third floors of the building to attractive cottages near the Hospital, and the entire Palmer Ward was devoted to the use of children, with the exception of space in the basement for the Department of Roentgenology. Soon space was again inadequate, and again the nurses had to be disturbed. An orthopedic ward was opened in the building occupied by them adjoining Palmer Ward, leaving more space for children in Palmer Ward.

It was largely the appeal of the children that finally resulted in the passing of the bill for the erection of the new University Hospital and in the establishment of the present modern clinics in all branches of practice that have brought widespread fame to the University of Michigan Hospital and Medical School.

In planning the new Hospital, space for the care of two hundred children was allotted on the sixth floor, to be designated as the Palmer Ward. It was decided to use the Palmer Building as an overflow or convalescent ward. It has always been hoped that a complete children's unit, connected with the main hospital building, ultimately would be provided. Because of this possibility and because of

a belief that the new Hospital would become inadequate for the needs of the other clinics, little if any architectural change for the special care of children was made on this floor.

Although there is need for better arrangement of wards, the children are in no way neglected. They are provided with well-equipped roof-garden service, manual training rooms, recreation and class rooms, occupational therapy rooms, and teachers. The Galens, a medical students' society, supports a shop in woodcraft, known as the Galens Shop for the training of convalescents. Physiotherapy in all its forms is provided, including a swimming pool for paralytic cases and the most modern X-ray facilities. But these advantages are scattered, and many of them could be brought together in a special children's unit where the special methods of juvenile care could be better stressed and carried out, thus, in many instances, making the situation for children and adults equally advantageous. There are no quiet wards for children—these are very necessary for the care of children with rheumatism, chorea, and heart disease. Nowhere has the state provided a place for the care of very young children with tuberculosis. Much can be done to benefit or cure these patients.

THE SPECIFIC INFECTIOUS DISEASES.—In 1910 a resolution for the construction of a contagious hospital was passed by the Board of Regents:

On condition that the City of Ann Arbor will furnish \$25,000 for the purpose of building a contagious disease hospital, the University of Michigan will furnish the site for the same and agrees to equip and maintain it after completion. Such hospital shall be for the sole use of patients taken sick of contagious diseases in the City of Ann Arbor, and such hospital shall be conducted under such conditions as shall be arranged between the City of Ann Arbor and the Board of Regents. (*R.P.*, 1910-14, p. 12.)

Four years later, in June, 1914, the Contagious Hospital was opened to the public for inspection. The new building with its new aseptic method for the care of contagious diseases, the second in America to adopt this plan, became the show place of the University Hospital group. Very pleasant quarters for nurses were fitted up on the second floor of the building, but as in all divisions of the departmental work, it was not long before more space was needed, and the second floor had to be used for patients. Again the nurses had to be moved. The size of this clinic, like that of all the others, rapidly increased after the opening of the new Hospital, and the building soon became, as it is today, entirely too small for requirements. In times of epidemic, which are not infrequent, auxiliary wards have to be opened, the working of the Hospital is greatly handicapped, and the time of the staff is greatly encroached upon.

In the winter of 1909 the demands of a contagious epidemic were met by boarding up the two summer houses, heating them with stoves, and using them as three-bed scarlet fever wards. It is hard to realize that not so many years ago it was necessary, because of Board of Health regulations and lack of isolation space, to have large wards in the general Hospital under quarantine for long periods of time. Three times during the college year of 1909-10 strict quarantine had to be observed, totaling an inactivity of over three months. In 1911 Palmer Ward was under quarantine for five months, and the surgical wards were rendered inactive, except for the most urgent cases, for as long as a month at a time. The effect this had on teaching in general and on the patience of teachers and clinicians in particular can well be imagined.

Since the opening of the contagious unit (1914), the introduction of the asep-

tic technique plan of caring for contagious patients, and the inauguration of the present method of handling contagious cases, a general quarantine has not been necessary, and partial quarantines have been of comparatively few days' duration.

For some years the work of an infectious disease institute has been carried on. Immunizations of all kinds are made in this division of the clinic, not only for the patients but for the entire personnel of the University Hospital. These immunizations consist of vaccinations against smallpox, typhoid fever, diphtheria, and whooping cough, the giving of antitoxins, of immune serums, and of immune blood transfusions, and the carrying out of desensitizations of various kinds for those who are allergic. The Contagious Hospital laboratories employ a full-time chemist and a full-time bacteriologist.

By 1922-23 ultraviolet light had become a popular therapeutic measure. The knowledge that this modality was being used indiscriminately caused members of the profession to guard its use very carefully. Other hospitals had reported favorably on its use. More than \$400 had accumulated in the Mary J. Furnum fund, and with this and an addition from the current budget a lamp was bought for the department. A technician was necessary, and finally a full-time nurse was engaged. The baggage room in Palmer Ward was released for use, better lighting was provided by a new window, and a quartz light division of the clinic was organized. Very soon the lamp was in constant use.

SENSITIZATION CLINIC.—In 1910-11 Dr. Cowie became very much interested in the work von Pirquet was doing in Vienna on allergy, and he conducted observations on cowpox disease and serum disease from that point of view. Oscar Schloss in New York had demonstrated

food sensitization in children and had prepared an egg allergen, ovo mucoid, for use in testing the skin for sensitivity to that substance. With Dr. Albert Byfield, Cowie immediately began work with this substance and carried on with all allergens as they became obtainable on the market. Up to this time the allergic therapy and testing had been limited to the use of pollen and horse serum antigens and eliminations. Hay fever had been treated by the use of commercial pollen extracts for some years.

General interest in sensitization developed rapidly because of the ease with which testing materials could be obtained and testing could be carried out by the simple scratch method. In 1921-22 John P. Parsons ('14, '19m) became interested in this work. Appreciation of his quick understanding, versatility, and dependability resulted in a happy association continuing many years. Because of rapidly developing enthusiasm concerning allergy at that time it was very necessary to make conservatism the watchword. The examinations soon became time-consuming, and the teaching and administrative duties were already very heavy. Extra help became necessary. In 1924 Buenaventura Jiménez ('05m, M.S.P.H. '27) applied for graduate work. He became interested in the sensitization clinic, then carried on in the basement of the Contagious Hospital. Cowie assigned "Studies on Allergy" to him as the subject of his thesis. Dr. Jiménez soon became proficient in the technique of testing and in following and recording the clinical course of the increasing numbers of patients sent to the clinic for examination and advice. To him more than to anyone else is due the development of the large clientele that finally came to the clinic. His enthusiasm, devotion, honesty, and personal appeal were all that was necessary. The daily attendance at the clinic be-

came so large that a few years later it was necessary to work out a plan to decrease it and yet at the same time to increase the number of new patients. This was accomplished by devising treatment schedules, diagrams, and instruction sheets so that the bulk of the treatments could be turned over to the referring physician, with whom the staff co-operates in every way possible. In order to compass the work two more assistants were necessary.

CLINIC CLASSES.—In 1920 a hay fever and asthma class was organized to bring the patients together to be instructed as a group and to ask questions and relate experiences. In this way they learned much from each other and gained a better idea of what the staff was trying to do for them. Diabetes, infant feeding, and cardiac classes were conducted in the same way.

Work in allergy had its beginnings in 1912, as publications from the department attest; it passed through the first few years of general interest and the succeeding years of doubt and ridicule; it now stands as one of the most important special divisions of medicine in all medical schools and in medical practice. There has never been a pause or diminution in the work of this clinic since its beginning. The clinic of the department continued to be known as the sensitization clinic; the one in the Department of Internal Medicine is the allergy service, which has been under the competent directorship of Dr. John Sheldon. Many clinical and scientific reports were published from the sensitization clinic. All of this work is now carried on in the allergy service.

TEACHING.—In the early days of the department teaching material was so meager and the demand for it was so great that removal to Detroit seemed to be the only answer. The clinical material has now become so rich as to

be unexcelled in variety and importance from the standpoint of teaching. This record is one of which the Medical School and the University Hospital may well be proud.

A subject as large as internal medicine and infantile and child nutrition had to be covered in some way with an almost insignificant budget and a part-time staff. One part-time clinical professor, one instructor, and a half-time intern constituted the entire staff. An assistant and a full-time intern were added. Later, an extra stenographer was provided. The registration list had reached 3,251. The working staff gradually was increased to one professor, two assistant professors (one at Children's Center, Marquette, Michigan), four instructors, one chemist, one bacteriologist, one instructor and two assistants in sensitization, one child psychologist, one teaching fellow, three rotating interns, eight assistant residents, a secretary, a clinic nurse, a clinic clerk, and a clinic ward helper.

With the increase in the size of the staff came the phenomenal increase in the size of the clinic, as stated before, to 6,346 patients a year (1932), and the outpatient attendance reached a monthly peak of 2,580 in August, 1935. The teaching load of 768 clock hours had to be divided between five instructors. The other members of the staff were necessary to help care for the patients.

The teaching in 1939 consisted of forty-eight hours for the entire junior class; sixteen hours for the entire senior class; sixty-four hours for the senior morning bedside section work, repeated four times during the year by each of four instructors; eighty hours of afternoon bedside instruction, repeated four times a year by each instructor; and 320 hours elective courses for junior students. The junior elective bedside section met twice a week for a two-hour period. There were from fifteen to twenty stu-

dents in these sections, which lasted eight weeks, thirty-two hours, and were repeated four times during the year.

The regular bedside section work consisted of rotation through the four divisions of the clinic: outpatient and sensitization, nursery and metabolism wards, boys' and girls' medical wards, and contagious hospital.

The teaching load included familiarization with all patients coming to the clinic. The average number of patients per instructor over a period of years is shown in the following table:

Year	Number of Members of Teaching Staff	Total Number of Patients	Average Number of Patients per Instructor
1928-29	5	4,100	820
1929-30	5	5,000	1,000
1930-31	6	5,686	947
1931-32	6	6,141	1,023
1932-33	6	6,346	1,057
1933-34	6	5,404	900
1934-35	6	5,398	899

CITY CLINICS.—In the beginning of the work of the department it was almost impossible to induce parents in the city to bring their children to the outpatient clinic at the Hospital. Dr. Cowie decided to move the afternoon outpatient clinic to the business section of the city. The Hospital Circle of King's Daughters (later, the Public Health Nursing Association) gave its co-operation, and patients became so numerous that in 1920 a second clinic had to be opened in "lower town." One instructor and an intern were assigned to each clinic. The nursing and the general management were attended to by the public health nurse. When the new Hospital was opened the clinic was moved there, where it is known as the Well Baby Clinic; it still co-operates with the Public Health Nursing Association.

COUNTY CLINICS.—In 1919, clinics, under the auspices of the Washtenaw

County Public Health Nursing Association of the Red Cross, were begun in many villages of the county. The medical work of these clinics was carried on by members of the staff of the Department of Pediatrics and Infectious Diseases. These clinics, in addition to rendering valuable service to the children of the county, furnished excellent experience for the graduate group in child welfare work. Unfortunately, because of lack of funds, they were discontinued in 1922.

CHILD PSYCHOLOGY.—For many years the importance of giving the students instruction in child psychology and in child psychiatry had been recognized—particularly with regard to behavioristic problems and personality changes. Helen Bradford Thompson Woolley (Chicago '97, Ph.D. *ibid.* '00) came to the department when the Merrill Palmer School was opened. Appreciating her ability as a teacher and lecturer, Dr. Cowie encouraged her to volunteer several lectures each year (1924–26) to the senior class. An effort was being made to have her given a regular appointment in the department when Columbia University called her to head its Child Development Institute. Janet Stetson Barnes (Buffalo '24, Michigan '28*m*) was appointed to the position of Pediatrician in the Elementary School and Instructor in Pediatrics. She was well trained in child psychology and psychiatry. Her teaching and clinical care of this group of children, very much handicapped as it was, was greatly appreciated. Lavinia MacBride MacKaye ('17, A.M. '20, '31*m*), who worked with and succeeded Dr. Barnes, was unable to continue because of increased duties on the campus, and the work finally had to be abandoned at the end of the 1936–37 session. Since the reorganization of the Department of Psychiatry as the Neuropsychiatric Institute, a division of child psychology and psychiatry has func-

tioned under Paul H. Jordan (M.D. Iowa '29), who was trained as a pediatrician and as a psychiatrist. The members of the staff gain much stimulation and knowledge from the close association that has been established with that department. Children enter the Neuropsychiatric Institute through the Department of Pediatrics and Infectious Diseases. About thirty beds were provided for their care in the institute.

MICHIGAN STATE SCHOOL FOR CHILDREN, COLDWATER.—Through an arrangement with the Superintendent of the State School for Children in 1930, a pediatrician was appointed to look after the medical needs of the children there. Dr. W. W. Redfern (M.D. Chicago '30), the first appointee, was particularly interested in immunology and continued his studies. Harold B. Rothbart (M.D. Toronto '30) was appointed to fill the place made vacant by Dr. Redfern's untimely death in February, 1932. Dr. Rothbart completed observations on basal metabolism in children, which were published the following year. Unfortunately, just as Coldwater was becoming known as an active center for pediatric investigation, it was decided to close the school, the oldest of its kind in the state, and to devote the buildings to other state purposes. The work of the school has been continued by the Michigan Children's Institute, situated in Ann Arbor in a new building near the Hospital grounds.

SERVICE TO THE INSTITUTE FOR HUMAN ADJUSTMENT.—All children applying for study and care in this institute receive through the Department of Pediatrics and Infectious Diseases a complete physical examination and record of laboratory tests. If medical conditions are found other than those for which the patient was previously admitted, they are cared for by the department. The institute has been of special service to the

department, particularly in the management of speech defects of various kinds.

THE COUZENS CHILDREN'S CENTER AT MARQUETTE.—Through the generosity of the late Senator James Couzens, funds were provided for the building of a children's center in connection with St. Luke's Hospital at Marquette. In 1931 Moses Cooperstock (Yale '23, M.D. *ibid.* '26), an instructor, was put in charge with the rank of assistant professor in this department. Four assistant residents serve in Marquette for a period of three months each. The opening of this clinic made it unnecessary for a large percentage of children in the Upper Peninsula to continue to come to the University Hospital, although many selected and unusual cases are referred to the department from this clinic. The center is rich in clinical material and furnishes another link in the chain of services designed to round out the special training of young physicians in pediatrics and infectious diseases.

THE COUZENS CHILDREN'S CENTER AT TRAVERSE CITY.—Also known as the Central Michigan Children's Center, this clinic was opened in 1936 with Mark Frederick Osterlin (Capital University [Ohio] '25, Michigan '29m) in charge, with the rank of teaching fellow. The organization is the same as at Marquette and the same rotation of an assistant resident is carried out. Here, again, while this clinic made it easier for children in the western part of Michigan to secure special medical care, it has had a distinct influence in decreasing registrations at the University Hospital.

To show the position of the clinic in the medical group of specialties the figures for 1929-36, of the "clinic classification percentage of patients," from the Hospital reports (*P.R.*, 1929-36) are given in the accompanying table, and, by way of contrast, percentage figures for larger surgical specialties are added.

CLINIC CLASSIFICATION PERCENTAGE OF PATIENTS ADMITTED

Year	Pediatrics	Internal Medicine	Neurology	Dermatology	General Surgery
1929-30	15.30	12.77	3.66	13.00	15.99
1930-31	16.22	13.14	3.77	13.99	15.98
1931-32	14.88	12.65	4.26	13.10	14.31
1932-33	15.34	12.75	3.45	11.52	14.73
1933-34	13.53	13.43	4.02	8.54	15.17
1934-35	12.79	15.23	4.00	7.29	14.75
1935-36	8.31	17.05	4.56	6.25	15.64

The chief reason for the decreasing number of children coming to the University Hospital has been legislative Act No. 248 (*P.A.*, 1933). The act dealt a serious blow to the long and successful effort to develop a children's clinic entirely adequate for the needs of teaching medical students.

Because of the nature of the Hospital monthly statistical reports, the work of the clinic has not appeared to full advantage, and the needs of the department accordingly have not been very apparent. The guarding of the entire group of hospitals against epidemic disease, for example, is in itself a difficult task. The clinic, however, receives credit only for the three hundred or four hundred cases that enter Contagious Hospital each year. The admitting of a smallpox patient means vaccination of the members of the entire working staff of the Hospital who have not been successfully vaccinated within two years. In one year three smallpox patients made it necessary to vaccinate sixteen hundred people. In 1938 the bacteriological division examined and reported on 7,138 cultures. If a measles case develops on a ward a prophylactic serum, prepared in the department laboratories, from blood taken from suitable donors, has to be given intramuscularly to all who have been in contact with the patient. In 1935-36, 95,040 cc. of blood were collected, from which 38,040 cc. of serum were prepared and 2,460 children were immunized.

REQUESTS.—Among the bequests for the care of sick children and research in diseases of children and infectious diseases may be mentioned the Palmer bequest of \$20,000, to be expended in the erection of "an appropriate and handsome ward of the University Hospital, to be known as the 'Dr. A. B. Palmer Memorial Ward,' and \$15,000 in trust, the income . . . to be devoted to the support and maintenance of free beds, in said building or ward . . ." (*R.P.*, 1901-6, p. 222).

The income from the Mary J. Furnum fund of \$1,000 is used for the purchase of apparatus for the study of children's diseases. This small fund has been of remarkable assistance.

When the Merrill Palmer School of Detroit opened its extension project in Ann Arbor in connection with the University for the purpose of affiliation with various departments for further investigation, particularly in child psychology, the Department of Pediatrics and Infectious Diseases was asked to undertake the medical aspects of the project. Accordingly, an instructor from the department was assigned to this duty. Physical and laboratory examinations were made for each pupil, and all pupils were inspected daily. At the end of the first year the Merrill Palmer School authorities offered a grant of \$3,000, which paid the salary of one instructor, for the purpose of carrying on the work of the school in conjunction with the Medical School, and furnished necessary equipment. Dr. John P. Parsons was relieved of all teaching responsibility for the year in order that he might study the protein requirement of children. A creditable investigation was carried on and published in the *American Journal of Diseases of Children*.

The University of Michigan Elementary School may be said to be the outgrowth of the Merrill Palmer School.

With its completion and its administration in the hands of Professor Willard C. Olson, the Merrill Palmer authorities felt that their work in Ann Arbor had been accomplished. The department carried on the same type of work as was done in the Merrill Palmer School. The salary of one instructor was provided, whose duties required that half time be spent at the school and half time at the clinic.

In 1932, because of an unused balance in the salary account of the department, the Regents authorized the use of \$500 for the purpose of bringing distinguished lecturers and teachers to the Medical School. Professor Armand de Lille of Paris and Professor Franz von Groer of Lemberg each delivered a series of very enlightening lectures and carried on bedside clinics and conferences. A few years previously Professor Heinrich Finkelstein of Berlin had come on a similar visit.

In 1929 Parke, Davis and Company made a substantial grant for the purpose of studying the comparative antirachitic effect of irradiated ergosterol made from ergot and from yeast. The investigation entailed the co-operation of the Department of Roentgenology and of the Department of Pathology. The work was carried on jointly by Katharine Mabone Jarvis (New Brunswick '21, Ph.D. Michigan '28), A. D. Emmett, and Dr. Cowie. The results of this investigation were published in the *Transactions of the University of Michigan Pediatric and Infectious Disease Society* (1929-30). In 1931 Parke, Davis and Company made a grant for the observation of the effect of certain carbohydrates on the growth and development of infants. The work was satisfactorily carried on by John Lealis Law (M.B. Edinburgh '29, Ch.B. *ibid.* '29, M.D. *ibid.* '34).

In 1930 Mead Johnson Company of

Evansville, Indiana, gave \$1,600 for investigations in diseases of infancy and childhood. As a result a study was made of the action of the various sugars used in infant feeding on the blood sugar curve; information was sought on the comparative assimilation and utilization of these sugars. Investigations with indirect relation to infant feeding were conducted, and three papers were published.

POSTGRADUATE TEACHING.—After Dr. Cowie's death in 1940, the W. K. Kellogg Foundation gave a grant of \$100,000 to effect a reorganization of the Department of Pediatrics in the Medical School. The plan of postgraduate work consists of a year's rotating internship here or in some other accredited hospital, a year as assistant resident in this clinic, a year abroad or in some other clinic, and an additional two years at the University as instructor—in all, five years of special training after graduation.

Professors Morse, Talbot, and Blackfan of Boston, Schloss, Schick, Holt, and Wilcox, of New York, Gerstenberg of Cleveland, Mitchell of Cincinnati, Breneman, Hess, and Poncher, of Chicago, Marriott and Hartman, of St. Louis, Finkelstein, of Berlin, Armand de Lille, of Paris, and Franz von Groer, of Lemberg, co-operated with Dr. Cowie in giving young men and women sent to them every possible advantage.

THE UNIVERSITY OF MICHIGAN PEDIATRIC AND INFECTIOUS DISEASE SOCIETY.—This society was organized in 1921 to bring the men in the field of actual practice back to the clinic at least once a year for an exchange of views. It has proved an unquestioned success.

In 1938 two amendments to the by-laws of the society were adopted, whereby all individuals completing one year's residency in the Department of Pedi-

atrics and Infectious Diseases become eligible for membership, and all those completing a rotating junior internship in the University Hospital and who, at the time of the meeting of the society, are assistant residents in the department become eligible for membership. This greatly stimulated interest in research.

Previous to this time journal club work was carried on by a selected group of students in the senior class. Assigned subjects were carefully reviewed by them, and the results of their studies were presented to the entire senior class. The reviews presented in 1913 were of such importance that they were published in the *Archives of Pediatrics*, and the reprints were bound in booklet form.

SOCIAL SERVICE.—Long before the designation "social service" was in vogue, much of this type of work was admirably carried on by the society of King's Daughters. The members of this society had provided books and amusement for children and for years had done many things to meet their needs.

Dr. Cowie finally prepared a report detailing the scope of social service as carried on at the Massachusetts General Hospital and at other large hospitals and presented it at one of the meetings of the University Hospital Clinical Society as a means of bringing about a general discussion on the subject. The members of all the clinical staffs favored the idea, and before long, with the co-operation of the Public Health Nursing Association, Miss Sarah Burrows was brought to Ann Arbor to begin social service work. Out of this work has grown the present organization. Without this service the Hospital could not function effectively.

D. MURRAY COWIE*

* Dr. Cowie died January 27, 1940. He was succeeded by Dr. Charles F. McKhann.

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THE DEPARTMENT OF PHYSIOLOGY

THE following sketch of the Department of Physiology covers eighty-nine years, and during much of this time the lectures and laboratory courses were required of students of the Medical School, the Homeopathic Medical College, and the College of Dental Surgery, and were also available to students of other departments who desired to elect them.

Physiology is the science which treats of the normal activities of living organisms. The vital processes of plants and animals are fundamentally the same, and the science of physiology is built up of a vast number of facts which have been ascertained by the study of many forms of life. With the growth of our knowledge of physiology the subject has come to be subdivided into a number of specialties—physiological chemistry (or biochemistry, as it is now called), physiological botany, physiological psychology, and others—many of which are now taught on the campus. Physiology in the

Medical School deals with the chemico-physical activities of the fluids, tissues, and organs of animals (especially man), their interdependence, and the way in which they react on the body as a whole in its response to the influence of its environment.

The importance of physiology in the training of the physician has always been recognized, and the subject was one of the four required for graduation of the first class of the Department of Medicine and Surgery.

TEACHING AND RESEARCH.—The first to teach physiology was Jonathan Adams Allen (Middlebury '45, M.D. Castleton Medical College '46), who was appointed Professor of Pathology and Physiology in 1850, but who later acted as Professor of Therapeutics, *Materia Medica*, and Physiology. New England born, a direct descendant of Ethan Allen of Revolutionary fame, he settled in Kalamazoo in 1846. Two years later, at the age of twenty-three, he became a professor in

the Medical College at La Porte, Indiana, whence he was called to the University of Michigan. According to Dr. W. F. Breakey, he had a striking personality and was a popular lecturer (Breakey, p. 274; Lombard, pp. 240-43). While at the University of Michigan he gave the introductory addresses to the classes of 1852 and 1853, addresses which were published by the classes. Besides the many addresses he delivered, he published a book on *Medical Examinations for Life Insurance*, which ran through no fewer than five editions. He had a keen sense of humor and could be decidedly sarcastic when he chose. For example, referring to epidemics, he said:

We need a careful chronicle of their visits and peculiarities from every part of the state. Isolated reports are comparatively valueless. What Doctor So-and-So saw or thought he saw; what wonder-working charms he carried in his dilapidated saddlebags; how many he cured or dismissed to the Superior or nether regions, although facts very interesting to Doctor So-and-So and his committee of old ladies, are, in a scientific point of view, hardly worth the paper on which he communicates them to the popular medical or secular paper, according as he believes or disbelieves in the code of ethics. ("President's Address," *Trans. Mich. State Med. Soc.*, 1859, p. 21.)

Allen was in many respects ahead of his time. He urged the accurate registration of births, deaths, and the causes of deaths, and the collection of statistics and observations upon epidemics and endemics. He pointed out the apathy of the public and the need for physicians who would educate the public to demand better trained doctors; and he called attention to the desirability of a high grade of preliminary attainment before matriculation in a medical school.

He argued in favor of a state hospital, and said:

By rendering this hospital subservient to

the clinical department of the State Medical College, the patients would while helpless themselves, be made to contribute to the general welfare, proving that "there is a soul of goodness even in things evil," and "from the nettle, danger, can be plucked the flower, safety." ("President's Address," 7th Rept. *State Med. Assn.*, 1859, p. 31.)

He had been trained as a physician and probably taught physiology from the point of view of the clinician. Although he is not known to have made any original contributions to the subject, he had a good knowledge of physiological literature. Dr. Huber, in his article on the history of this school, wrote:

. . . The whole subject of reflex nervous influence, of which excito-motor and excito-secretory action are but constituent parts, was taught as early as 1850 in the University of Michigan [by J. Adams Allen], and in his teachings and writings are to be found the only explicit and comprehensive exposition of the whole subject of reflex nervous action that has ever fallen under my observation. (Huber, "Historical Sketch," p. 608.)

Something of the man is revealed in the following extracts from an address:

Here is the *standpoint of view*. Medicine is to be looked upon and studied, precisely as all other arts and sciences are to be looked upon and studied. The truths upon which it is assumed to be based, are to be tested as all other truths are tested; and when they cannot abide the same, let them be mercilessly discarded. (J. A. Allen, "Observations on the Medical Platform," p. 24.)

Condemning books which are merely compilations of old dogmatic teachings, he said: "We want a living, breathing, productive literature, not a barren, dead, marshalling of old errors" (*ibid.*, p. 27).

Unfortunately, Allen became involved in some difficulty, and in 1854 was asked to resign. The *Proceedings* of the Regents contain merely a resolution, signed by twelve of Allen's colleagues, headed by Tappan, asserting that "the pros-

perity of the Medical College and the general welfare and harmony of the University are seriously affected by the connection of Dr. J. Adams Allen with the institution as a Professor" (*R.P.*, 1837-64, p. 565).

When Allen left the University he apparently returned to Kalamazoo, where he became a prominent and respected physician, as is shown by the fact that he was the president of the Michigan State Medical Society in 1859. That same year he was called to be professor at Rush Medical College, Chicago, and later he became its president.

The next to teach physiology was Abram Sager (Rensselaer Polytechnic Institute '31, M.D. Castleton Medical College '35, A.M. hon. Michigan '52). During his nearly thirty-three years of service beginning October 1, 1850, when as the first President of the Faculty of the Department of Medicine and Surgery, he gave the opening address, he played many important roles in the University (Huber, *Sager*). He became Professor of Obstetrics, Physiology, Botany, and Zoology in 1854, but the next year was called merely Professor of Obstetrics and Physiology, which title he kept until 1860, when he again taught, instead of physiology, the diseases of women and children. Dr. William F. Breakey, who was a student during Sager's time, said of him: "It is no disparagement to other members of the faculty of his time to say that he was one of the most profound and versatile in literary and scientific scholarship" (Breakey, p. 270). In the journals of the period are translations upon the respiration of cold- and warm-blooded animals, when caused to inhale exciting, indifferent, and directly noxious gases. He collected a

valuable herbarium (see Part VII: UNIVERSITY HERBARIUM) and made considerable additions to the medical museum, then considered an important teaching adjunct (see Part V: DEPARTMENT OF MATERIA MEDICA AND THERAPEUTICS). Of his ability as a practitioner, "a few of the older residents of Ann Arbor speak reverently and lovingly" (Shaw, p. 123). Because of failing health he resigned in 1873, and was made Professor Emeritus in 1874.

Corydon L. Ford (M.D. Geneva Medical College '42, A.M. hon. Middlebury '59, LL.D. Michigan '81) was appointed Professor of Anatomy in 1854, and Professor of Anatomy and Physiology in 1860. He held this title until he resigned a short time before his death, April 14, 1894. From 1887 to 1891 he was Dean of the Department of Medicine and Surgery. Dr. Charles B. Johnson, one of his old students, said of him:

Dr. Corydon L. Ford, who taught us our Anatomy and Physiology, was in a class by himself. He could pick up a dry bone and in three minutes have hundreds of wide-eyed, open-mouthed hearers intently attentive lest they should miss a word, such was his power over an audience. (Johnson, p. 18.)

When Ford at the age of eighty-one delivered his last lecture, Dr. Lombard had the good fortune to be present and was greatly impressed by his distinguished bearing, his method of presentation of his subject, his grace in the demonstration of the dissection (in spite of his handicap of one shortened leg), and his remarkable hold on the attention of the student audience (Lombard, p. 244). Unquestionably he was the best lecturer on anatomy this country had seen. Ford was not a trained physiologist, but he deduced the functions of the human body from the structure of its dead organs; his demonstration of the action of the valves of the heart and the cause of the heart sounds, for example, was convincing. He

had little to do with the teaching of physiology in the Department of Medicine and Surgery after 1872. He gave lectures on anatomy, physiology, and hygiene to the students of the Department of Literature, Science, and the Arts, however, as late as 1877, having begun these lectures to nonmedical students in 1869.

Henry S. Cheever ('63, A.M. '66, '67m) was appointed Demonstrator of Anatomy and Curator of the Medical Museum in 1867. He was appointed Lecturer on *Materia Medica* and Therapeutics in 1868 and was advanced to the professorship the following year. In 1872-73 he was made Professor of Therapeutics, *Materia Medica*, and Physiology, and during the same period he filled the chair of physiology in the Long Island College Hospital.

Throughout this time he was also engaged in general practice, and it is not strange that under the accumulated strain of these combined labors his health broke down (Breakey, "Cheever," p. 152). In 1873 he obtained a leave of absence, and his work was carried on by Frederic Henry Gerrish (Bowdoin '66, A.M. *ibid.*, '67, M.D. Medical School of Maine '69, LL.D. Michigan '05) as Lecturer on Therapeutics, *Materia Medica*, and Physiology. That year the *Calendar* stated (p. 62):

It is absolutely necessary before taking up these advanced studies in Surgery [Ophthalmology and Otolaryngology] that the student should be fully acquainted with the Anatomy, Physiology, and Physics of the special senses *seeing and hearing*.

In 1874 Gerrish became Professor of Therapeutics, *Materia Medica*, and Physiology. Cheever returned in 1875 and tried to lecture, but his voice failed him and he was obliged to abandon the work. He had made a brave fight and died much respected by his fellow practitioners. Something of his character is suggested by the closing sentence of his

letter of resignation to the Board of Regents, March 27, 1876: "Trusting that the time is close at hand when the Department of Medicine and Surgery shall have its course lengthened and graded, I sever my connection with it with profound regret" (*R.P.*, 1876-81, p. 5).

Upon Cheever's resignation, the Regents requested Ford, who still retained the title of Professor of Anatomy and Physiology, to fill the chair and discharge the duties of the professor of physiology, aided by an instructor in the Physiological Laboratory whom they would appoint (*R.P.*, 1876-81, p. 147). The result was that Burt Green Wilder (Lawrence Scientific School '62, M.D. Harvard '66), of Cornell University, was appointed Lecturer in Physiology, to give one course of lectures in 1876-77. Charles Henry Stowell (Genesee Wesleyan '68, Michigan '72m) was made Instructor in the Physiological Laboratory, under the direction of Professor Ford. Stowell retained this title until 1879, when he became Lecturer in Physiology and Histology, and in 1880 he was appointed Assistant Professor of Physiology and Histology. The next year he was made Assistant Professor of Histology and Microscopy.

In 1881 Henry Sewall (Wesleyan '76, Ph.D. Johns Hopkins '79, M.D. Denver '89, M.D. hon. Michigan '88, Sc.D. hon. *ibid.* '12) was appointed Lecturer in Physiology (Lombard, p. 297). He had received training in biology under Newell Martin, who in turn had been trained under Huxley and Michael Foster. After receiving the doctor's degree, he worked with the celebrated German physiologist, Kühne, in Heidelberg, and on his return to Baltimore was appointed associate in biology at Johns Hopkins.

Victor Clarence Vaughan (Mt. Pleasant College [Mo.] '72, Ph.D. Michigan '76, '78m, LL.D. '00) was at this time (in 1880) Assistant Professor of

Medical (physiological) Chemistry. To quote from Novy's address at the memorial meeting for Dr. Vaughan:

Through his work in physiological chemistry he was in touch with the progress in physiology, which was then looming strong on the horizon as a result of the work of men such as Claude Bernard, Ludwig, and Foster. And when there arose in 1881 the question of an independent chair in that subject, young as he was, he strongly urged and secured the appointment of Henry Sewall, who proved to be an inspiring teacher and an investigator of the first rank. (*Vaughan Memorial*, p.8.)

The fact that a man who did not have a medical degree, but who had been trained as a biologist, was called to do this work showed that the medical faculty recognized the value of pure science as a foundation for medical education. In 1882 Sewall was made Professor of Physiology, and given an assistant, Willis Elmer Hallowell ('82m).

From the first Sewall had devoted himself to research work. During the eight years that he was connected with the department he published twelve articles, in which he gave full credit to those who worked with him (Lombard, pp. 298-99). The most remarkable of these researches was the one on immunity. To Sewall belongs the credit of being the first to give incontestable proof that it is possible artificially to establish immunity to a purely chemical poison which is the product of a living cell, by injecting the poison into an animal frequently, in small increasing doses. Sewall saw the importance of his discovery. He wrote: "We may suspect that the same sort of resistance against germ-disease might follow the inoculation of the appropriate ptomaine, provided it is through the products of their metabolism that the bacteria produce their fatal effects" (Sewall, p. 203).

The year following the publication of his discovery, Sewall, attacked by tuber-

culosis, was given a leave of absence, and in 1888 resigned and went to Denver. He later became one of Denver's most prominent physicians and wrote many excellent medical articles in which the application of physiology to clinical medicine was given prominence. There are at least fifty papers carrying his name (Lombard, pp. 297-301).

The year 1888-89 was unfortunate for the Department of Physiology, not only because of Sewall's illness, but also because Elmer Sanford ('87), who had been his assistant, and who had been appointed Instructor in Physiology, died. Gustave A. Deutcher, Assistant, carried the work for a time, and then Joseph Weatherhead Warren (Harvard '71, M.D. Bonn '81) was called from Harvard to complete the course of lectures.

In 1889 William Henry Howell (Johns Hopkins '81, Ph.D. *ibid.* '84, M.D. hon. Michigan '90, LL.D. Trinity '01, Sc.D. Yale '11, LL.D. Michigan '12), who was associate professor of physiology at Johns Hopkins in 1888-89, was appointed Lecturer in Physiology and Histology. He had been trained in physiology, as Sewall had been, by Martin at Johns Hopkins. Howell was made Professor of Physiology and Histology the next year. It was not easy to lecture to a class of women and men, consisting of students from the medical, homeopathic, dental, and liberal arts departments, some of whom, at least, had the reputation of being unruly. Howell concealed beneath a quiet, mild manner great strength of character, which came to the fore when certain students tried to take advantage of him. Howell decided that either they or he would leave the University. The students left, and he had no further trouble with his classes.

In addition to his work in the Medical Department, Howell was listed in 1890 and in 1891 on the staff of the Department of Law, as Lecturer on Mi-

croscopy in its Medico-Legal Relations.

After Stowell left the department, Howell was given charge not only of the teaching of physiology, but also of the instruction in histology. To help him, in 1889 Gotthelf Carl Huber ('87m, Sc.D. hon. Northwestern '30) was appointed Instructor in Histology, and the work in physiology and histology was carried on in the Physiological Laboratory. In 1891-92, when Huber had a leave of absence, Frank A. Waples ('89, '93m), who had previously acted as an assistant, served as Instructor in Histology. Howell and Huber were thoroughly congenial, and together did research work which resulted in two excellent papers bearing their names. Howell published four other papers as a result of his research work at the University of Michigan. The name of Elizabeth Cooke appeared on one of these, and that of Sidney Budgett and E. Leonard on another (Lombard, p. 302). Howell left the University in 1892 to go to Harvard, where he took charge of the new laboratory course in physiology. Soon afterward he was called to Johns Hopkins, where he later filled many important positions.

Warren Plimpton Lombard (Harvard '78, M.D. *ibid.* '81, Sc.D. hon. Hobart College '09) was appointed Professor of Physiology and Histology in 1892, the appointment being confirmed the next year, and he was made Professor of Physiology in 1898.

Lombard had received his original training under Ludwig in Leipzig; had served under Curtis, as assistant in physiology, at the College of Physicians and Surgeons, New York; had done research work at Harvard, Johns Hopkins, and in New York; and had been assistant professor of physiology at Clark University for three years, until he resigned in 1892. He was a physiologist, not a histologist, although he was called Professor of Physiology and Histology.

A number of Lombard's original investigations were made with others—two with Professor Walter B. Pillsbury, one with Sidney P. Budgett, two with Fred M. Abbott, and five with Dr. Otis M. Cope. The physiology of man especially interested him, and this interest resulted in three papers dealing with the influences which affect endurance in voluntary muscular work. He invented a balance capable of supporting a man and of recording the changes of weight occurring during short intervals of time; devised a piston recorder with the aid of which the effect of respiration and vasomotor action to produce rhythmic changes of the human heart were studied; and, working in Professor Max von Frey's laboratory in Würzburg, discovered a method of observing the capillaries of the human skin and measured the blood pressure in the arterioles and capillaries. He gave much time to studying the influences which determine the duration of the systole and diastole of the human heart.

The physiology of nerve muscle in general was another of Lombard's major interests. He wrote papers on the mechanical effects of the contraction of individual muscles and on the action of two joint muscles, as demonstrated by a model. He also wrote an article on electrotonus, and a section in the *American Textbook of Physiology* on nerve muscle.

In addition brief reports were published on special apparatus devised in the laboratory, as well as addresses, including "The Life and Work of Carl Ludwig."

In December, 1922, he presented his resignation, to take effect in June, 1923, on the completion of thirty years of service. He was made Professor Emeritus in January, 1923, and in August of that year he presented his library to the University for the use of the Department of Physiology.

In 1892-93 the staff consisted of the professor and a student assistant. There was no laboratory mechanic, and, since appropriations for the laboratory were small, the staff had to make and repair the smaller apparatus used in the laboratory course. The assistant was Sidney Payne Budgett ('95*m*), who had worked with Howell and who continued in the department until 1896, when he became professor of physiology in the Medical School of Washington University, St. Louis.

It was in 1901-2 that the largest number of students (282) attended the lecture course. That year fifty-three students took the laboratory course. The assistant, Wilbur Pardon Bowen ('00, M.S. '01), was made Instructor in 1902. He left the following year to become professor of physical education at the Michigan State Normal School, Ypsilanti. While in the University he published five articles, two of which dealt with the effects of bicycling on the heart rate, blood pressure, and duration of systole.

Only one student assistant had been allowed until 1903-4, when there were two; in 1905-6 there were three. In 1906 Carl John Wiggers ('06*m*), who had been an assistant from 1903 to 1905, was made Instructor in Physiology, a position which he held for seven years. He was given charge of the department in 1910-11, while Dr. Lombard was in Europe on leave. During this year, Wiggers gave the regular lecture courses, except those for the dental students. The latter were taught by Otis Merriam Cope ('02, '04*m*), who was appointed Instructor in Physiology in 1910. Wiggers and Cope, with the aid of two student assistants, both of whom had served the preceding year, supervised the laboratory work. Wiggers resigned in 1912 to take a position at Cornell Medical School and became professor of physiology at Western

Reserve University in 1918. While in Ann Arbor he did excellent research work, publishing fourteen papers from the University.

For many years a few students of the College of Literature, Science, and the Arts had elected the lectures and laboratory courses in physiology, usually with the idea of teaching the subject. As students planning to study medicine were urged more and more by the medical faculty to extend their premedical preparation, the number from the liberal arts college increased; these students elected courses in physiology as their science subjects.

The number of students enrolled in the laboratory course gradually increased until by 1923 the work was being given to two sections of about eighty students each. This necessitated an increase in the staff, and six student assistants were employed in addition to the professor and the instructor.

From 1910 to 1926, Otis Cope, as Instructor and later as Assistant Professor, helped teach the dental students. Eventually he had full charge of their work in physiology. The course of lectures that he gave them was less detailed than that offered to medical students and was elected by some students from the College of Literature, Science, and the Arts who wanted a less extensive course—such as those preparing to teach physiology or physical training in high schools, or to be supervisors of school hygiene. Cope played a significant role in physiology. A good organizer as well as a good teacher, he was of great service during the sixteen years that he was connected with the Department of Physiology. He resigned to accept a professorship in physiology in the New York Homeopathic Medical College in 1926. His name appeared on seven published researches, five of which were made with Dr. Lombard on the influences control-

ling the duration of the systole and diastole of the human heart.

John Henry Muyskens ('13, Sc.D. '25), who had been Instructor in French and through his work with Professor Meader had become interested in the mechanics of phonetics, did some research work in the Physiological Laboratory on the movements of the mouth, especially of the soft palate. In 1922-23 he became Instructor in Physiology and helped with the laboratory work. In the summer of 1923 he and Dr. Cope conducted an optional laboratory course in physiology. Later, he continued his studies of the mechanics of phonetics in relation to abnormalities of speech.

Other pieces of research in the Physiological Laboratory which were published during the years 1892-1923 were papers by David P. Mayhew and A. E. Guenther; two by George O. Higley, Instructor in Chemistry, who undertook some investigations on the rate of excretion of carbon dioxide; and two by Thomas A. Storey, later Professor of Physical Education at Leland Stanford Junior University.

In 1923 Robert Gesell (Wisconsin '10, M.D. Washington University '14) succeeded Lombard as Professor of Physiology. He had already gained a name for himself in research when he came to the University of Michigan, and this, together with his wide experience as a teacher, made him a welcome addition to the faculty of the Medical School.

At first Gesell had to occupy the quarters in the old Chemical Building (Pharmacology Building), which had been the home of the Department of Physiology since 1910. He wrote in his account of the department:

When I came to Michigan I found a well-organized department but with the growth of physiology and of the classes the University quarters were again in a crowded condition. Fortunately new space [approximately 32,-

000 square feet gross] in a building to be completed within two years was allotted to the department along with funds for added equipment. With these augmented facilities the possibility of extending substantial opportunities for undergraduate and graduate students and for staff research was at hand. (Gesell, p. 43.)

METHOD AND CURRICULUM.—The history of the Department of Physiology shows an appreciation of the clinical method of instruction from the earliest days, but the conception of a physiological laboratory came much later and was of slow development. With the growth of the laboratory occurred an increasing emphasis on research.

LABORATORY INSTRUCTION.—The first teacher of physiology at the University, Professor Allen, in his president's address in 1859 before the Michigan State Medical Society said:

It is about as difficult to convey to a student by oral instruction any definite ideas of particular diseases, as it is to explain colors to a blind man or sounds to the deaf . . . It is the clinic only which is the truly substantial part. (P. 27.)

He did not refer to laboratory work, for at that time there were no physiological laboratories in the country.

In his introductory address to the third session of the College of Medicine and Surgery Professor Allen argued the importance of the writing of theses by students. Probably it was due to him that in the first years emphasis was laid on the writing and defending of an original thesis on some medical subject, as a requirement for graduation.

Although a histological and physiological laboratory was organized in 1876 and \$3,500 was appropriated by the legislature in the next year for its equipment, the teaching of physiology could not have advanced greatly because the professor at that time, Stowell, was not a trained physiologist, but a histologist. In short,

for the first thirty years of the existence of the Department of Medicine and Surgery physiology was taught at the University of Michigan as in the other medical schools of the country in those years, almost wholly by lectures and recitations and by the use of textbooks.

From the time when Sewall came (1882) the teaching of physiology changed. Of course he gave lectures—forty hours each semester the first year, and in 1883 seventy-two hours each semester. The completeness of his lecture course is indicated by the synopsis that he published for the use of the students (Sewall, *Topical Synopsis*). But his chief interest was in the laboratory, which he developed as rapidly as he could. At first, the small amount of equipment and inadequate facilities permitted opportunities for research work to advanced students only. We read in the *University Calendar* for 1882-83 (p. 93): "Students willing to devote time to *original work* in Physiology, Physiological Chemistry or other branches, after due preparation, are given the fullest encouragement and co-operation." This statement was undoubtedly inspired by Dr. Vaughan, who ardently advocated research work, not only by the teachers, but also by the more competent students.

In 1883 the legislature appropriated \$2,000 for apparatus, and the *Announcement* of the Department of Medicine and Surgery stated that a special course of practical demonstration in physiology would be offered the second-year class. The laboratory was to be open daily for purposes of physiological experimentation and research. The list of apparatus was, however, limited to those instruments which were the most essential and, in general, to one piece only of each type. In those days almost all physiological apparatus had to be imported from England, France, or Germany.

By 1885 the number of instruments

had been increased so that there were some duplicates, sufficient for a small number of students, and that year the demonstration course became an optional laboratory course in which the student made the experiments himself. This course, which was later extended, Sewall continued to give as long as he was with the department. The course was very complete, as is indicated by the notes still preserved in the physiological library. This was the first laboratory course in physiology offered in any medical school of the country, although earlier Newell Martin had supplied one for students of biology. It had been an uphill fight. One notice in the account of the apparatus in the *Announcement* that there was a foot-power lathe, which means that the professor and his assistant had to take off their coats and make some of the simpler instruments. No laboratory instrument-maker could be thought of in those days.

The *Calendar* of 1887-88 noted the unsurpassed facilities for practical work in physiology (p. 26):

A large and well-lighted room is appropriated chiefly to the use of undergraduate students who perform under the direction of instructors most of the fundamental physiological experiments A smaller room is devoted to advanced work and original investigation. Conveniently situated are an apparatus-room, a dark chamber for optical experiments, an incubation closet, and a large work shop containing machinists' and carpenters' appliances. The instrumental equipment of the Laboratory is unusually complete.

With the completion of the new Anatomical Laboratory Building the Department of Physiology had inherited the former quarters of the Department of Anatomy, that is, all of the third floor (except the northeast corner room, which Dr. Ford continued to retain for himself) and the attic in the old

Medical Building. Both the large room on the third floor and the loft were well lighted by skylights. Of course they were somewhat odorous—to put it mildly—after the many years during which they had been used as dissecting rooms, but they gave ample space for the work.

Howell carried on the work of the department on the lines which Sewall had established. The first year he lectured and continued the optional laboratory course inaugurated by his predecessor. Later, he extended the work, as shown by the little book of *Laboratory Directions* which he had printed for the use of his students in 1891. In 1890 the medical curriculum was lengthened from three to four years (of nine months each). In the schedule of courses for medical students given in the *Calendar* of 1890-91, lectures in physiology were listed for three hours in the second year and for two hours in the third year. At the same time, a practical laboratory course was provided, to last throughout the second semester, 1 to 5 P.M. daily, for students of the third year, and this course was required, except for the students who were to be only three years in the Department of Medicine and Surgery. The next year this laboratory course in physiology was a requirement for all students, the first laboratory course in physiology to be required in any medical school of the country.

Professor Howell was one of the speakers at President Hutchins' luncheon at the celebration of the seventy-fifth anniversary of the founding of the University of Michigan (1912). In his address he said:

It has been some twenty years since I had the pleasure and the privilege of being a member of the Faculty of this University. Although this connection lasted but a brief three years, it formed an eventful period of my life, for I made here some friendships which I prize highly and I acquired for the University a re-

spect and an affection that have been intensified by every succeeding contact When the methods of the experimental sciences began to penetrate into the field of medicine some of the older and more influential schools failed to adjust themselves to the new conditions and thereby lost gradually their prestige. The Medical Department of this University on the contrary was among the first to adopt the newer methods of instruction and early enrolled itself among the progressive schools in this country. (*The Seventy-fifth Anniversary University of Michigan*, pp. 77-80.)

He paid respect "to the determined spirit, clear vision, and devoted loyalty of him who for so many years has acted as its Dean [Dr. Vaughan]," and added: "The record made by it for important and scholarly contributions to medical science and medical practice is equal, I believe, to that of any other medical school in this country."

In the medical *Announcement* of 1892-93 the following statement, reminding one of Allen's introductory address of 1852, appears:

Knowledge is gained from one's personal observation or experience or is communicated from one to another. The former is positive knowledge, while the latter may be designated as hear-say. The medical student acquires this positive knowledge in the laboratory, in the ward and autopsy room, while he must depend for much of his information upon lectures and textbooks. It is the aim of this school to give its students all the positive knowledge possible and with this in view, great stress is laid upon the laboratory instruction in [Various sciences were mentioned, but unfortunately physiology was omitted from the list].

The members of the medical faculty have always vied with one another for time for their laboratory courses, each of them honestly believing that the course which he was giving was the most important in the development of a doctor. When Howell left in 1892, and a new

man was to come, the opportunity was too good to lose; consequently, the new man, Lombard, found that he was to give five lectures a week each semester, and that the laboratory course in physiology was to be no longer required, that in its place an optional one of six weeks had been substituted, and that there was no time left when the regular medical student could take such a course.

The lectures and recitations of 1891-92 were attended by 235 students—medical freshmen and sophomores, homeopathic medical students, dental, graduate, and pharmacy students, and those from the Department of Literature, Science, and the Arts. In addition, there were three sections of optional laboratory work, for medical, homeopathic, dental, liberal arts, and graduate students.

From 1892 to 1904 there were only minor changes in the work of the Department of Physiology. The medical, homeopathic, and dental students were required to attend the lectures and recitations, and there were always a few graduate students and students from the School of Pharmacy and the Department of Literature, Science, and the Arts who elected the courses. Usually there was a special quiz section for dental students. The practical laboratory course, which was optional for all students, continued to be given to small sections, the number totaling from twenty-one to fifty-four. The laboratory was at all times open to students sufficiently advanced to do research work, and courses were offered for students proposing to teach physiology.

In 1904-5 the practical laboratory course in physiology became a required course for medical and homeopathic students, although it was elective for students in other departments. That year the course was given in three sections to seventy-six students, and in 1905-6, 103 took the required course in laboratory work, which was given five afternoons a week for nine weeks.

With the coming of Gesell (1923) there was a change in the teaching of physiology. At that time the old methods of lectures, recitations, and frequent written quizzes, in which the student was made to feel that his work was definitely assigned and under constant supervision, was altered. The student was given greater freedom to do his work in his own way, this being especially true of the laboratory work.

In 1930 Professor Gesell described the methods of instruction:

Formal instruction is offered to three groups of students in medicine, dentistry and physical education. An introductory course of eighty lectures on human physiology with demonstrations is given jointly to the students of dentistry and physical education during the second semester. In the following semester another set of forty-eight lectures on the physiology of muscular exercise is given to the students of physical education. The course in physiology offered for the students of medicine begins the second semester of the first year of the medical curriculum with a series of lectures, demonstrations, and conferences. These lectures and demonstrations include an introduction to general physiology followed by a systematic discussion of the physiology of muscle, nerve, circulation, and respiration. The remaining subjects are concluded during the first semester of the sophomore year, the class meeting three times a week. The laboratory course, which consists of eight weeks of five three-hour periods and one laboratory conference each week, may be taken during the summer session between the two lecture courses or in the fall along with the second set of lectures. All courses offered by the department are open to undergraduate and graduate students of any school who have adequate training in physics, chemistry, and biology.

In the combined course for dental and physical education students, the enrollment is about one hundred and twenty-five; in the course in the physiology of muscular exercise about twenty-five. The enrollment in the course for medical students is about one hun-

dred and eighty, of whom approximately one hundred and fifty are medical students. . . .

In our lectures we attempt to cover the subject in a fairly systematic way emphasizing the principles of physiology, the methods of research, and the means of arriving at conclusions. Demonstrations are freely used. Clinical data are frequently employed and found valuable not only in establishing fundamental principles but in gaining the interest of the students as well. Reference to original literature and to monographs are given but there is no assigned reading. It is left to the student to determine whether he reads or not. Three standard text-books are recommended but no specific one required. The class is divided into three sections for weekly conference. . . .

The laboratory course is in the process of development. At present there are thirty-seven experiments each requiring on the average one complete laboratory period. One experiment (respiration of man) runs the entire week. The physiology of muscle, nerve, central nervous system, special senses, circulation, respiration, secretion, and metabolism [is] represented in varying degrees. Our aim is to develop careful technic, accurate observation, clear thinking, and sound deductions. With that in mind as much reliable standard research equipment is provided as the funds will permit. Detailed laboratory instructions are kept at a minimum. Quantitative analysis of results with the use of graphs is encouraged. Brief descriptions bearing only on the essentials are submitted by the student for weekly inspection. So that inspection may be critical, only a small proportion is graded. The student does not know which experiment is graded, neither are the grades reported. It is for the student to determine whether or not he is satisfied with his work. He has an opportunity to find his weak points at laboratory conference and through the instructors in the laboratory.

Twenty-three of the experiments the student does in the large general laboratory with equipment issued to him for the course. These experiments he is free to carry out when he pleases. The laboratory is open day and night throughout the week. The remaining experiments which are performed in the outlying rooms require special equipment

and more guidance. These are assigned on posted schedules to the students in rotation. (Gesell, pp. 43-44.)

From the beginning of 1935-36, laboratory work has been offered as a special course to the students of the School of Dentistry during the second semester.

COMBINED CURRICULUM.—Dr. Novy, in his address at the memorial meeting for Dr. Vaughan, said:

[A] significant step due to the initiative of Dr. Vaughan was the early establishment of the combined curriculum. By arrangement with the Literary Faculty in 1892, students were permitted to register in the Medical School at the close of the third year and were given their bachelor's degree upon the completion of the first year in medicine. Eventually this arrangement was modified so that a student desirous of obtaining the two degrees could shorten the time from eight to seven years for the A.B. degree and to six and a half years for the B.S. degree. By this arrangement the Medical School sacrificed nothing since the Literary College merely gave credit to which any student would be entitled if he elected such medical courses. (*Vaughan Memorial*, p. 11.)

SUMMER INSTRUCTION.—No one was enthusiastic about teaching in the summer, but, because of the low salaries, it was done to help pay living expenses. Wiggers, Cope, and Muyskens all taught summer laboratory courses in physiology at various times, and sometimes to rather large numbers, the work being carried on in the same manner as during the regular sessions. The complete advanced course of lectures and laboratory instruction is offered during the summer. This opportunity of meeting all of the requirements in physiology has attracted many out-of-state medical students.

BUILDINGS USED.—Originally the lectures were given in one of the two lecture rooms in the old Medical Building. After the addition had been completed in 1864, the amphitheater (the upper

lecture room) was undoubtedly used by Professor Ford. Sewall, Howell, and Lombard lectured there until 1906, when it was declared unsafe, and then Lombard was assigned the amphitheater of the old Homeopathic Building on the north side of the campus. After 1910 Lombard lectured in a small amphitheater which had been built at the east end of what was known as the old Chemical Building (Pharmacology Building), except when the classes were too large and he had to use the west lecture room of the West Medical Building. Professor Gesell gave his lectures there until the East Medical Building was constructed in 1925; after that he used the lecture room in the east wing. The laboratory work also was shifted from place to place as time went on.

When the new Anatomical Laboratory Building was completed in 1889, Howell took over the former anatomical quarters—all of the third floor and the attic. Howell's private room was in the southeast corner. Lombard occupied these

rooms, using the large room as a general laboratory, and the attic for a shop and for research. It was not until 1910 that the Physiological Laboratory was moved to the third- and fourth-floor rooms of the Pharmacology Building, near the center of the campus. Lombard used the large room on the northwest corner for his private office and for much of the research work of the staff. Special experiments of the students took place in small rooms on this floor or on the floor above. Other rooms on the fourth floor were used for the shop, for research work, and for storing instruments, one room being devoted to a balance for recording the loss of weight. The animals were housed in the east end of this floor.

Gesell found quarters crowded. Fortunately, new space, approximately 32,000 square feet gross, consisting of the second, third, fourth, and fifth floors of the south wing of the East Medical Building was allotted to the department in 1925.

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* Died July 13, 1939.

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THE DEPARTMENT OF POSTGRADUATE MEDICINE

THE Board of Regents of the University of Michigan in 1892 gave support to a program of postgraduate education when it authorized the faculty of the Department of Medicine and Surgery to admit medical graduates to undergraduate classes. This provision of the Regents was made in recognition of the rapid increase of medical knowledge. The discoveries of Pasteur were bringing about great changes in the practice of medicine and offering renewed hope in many of the most baffling problems in both medical and surgical fields. The medical graduate in search of further educational opportunities was being forced to look to the Old World medical centers. In extending the teaching facilities of the undergraduate Medical Department, the Regents, in a forward-looking policy, provided an opportunity in this country for the medical graduate to keep abreast of modern advances in practice.

The Department of Medicine and Surgery, in addition to admitting graduates to already established courses, the subject matter of which had been greatly increased since their graduation, offered special graduate courses in hygiene, bacteriology, electrotherapeutics, microscopic and gross pathology, physiology, histology, chemistry, and therapeutics. These were given once a year, in the

summer, and were usually six weeks in length. This program continued with some interruption until 1920. As a substitute, one day of teaching each month was offered in the form of a composite program for practitioners. This plan, too, was finally discontinued, and various medical organizations, notably the Michigan State Medical Society, established postgraduate conferences throughout the state to which members of the University teaching staff frequently contributed. These conferences were well received by the medical profession, but there was a growing demand for greater continuity and more academic direction of the program.

In January, 1926, representatives of the University of Michigan Medical School and the Detroit College of Medicine and Surgery were invited to meet with the council of the Michigan State Medical Society to consider ways and means of meeting the rapidly growing needs for postgraduate study in Michigan. The meeting was held in Ann Arbor, and the officials of the council presented a résumé of their efforts in this field, of the difficulties experienced, and of the growing demands. Dr. Clarence C. Little, President of the University, and the faculties of both schools responded sympathetically and a committee of three, representing the two medical

schools and the Michigan State Medical Society, was assigned to study the problem for a year and report at a similar joint conference at the next annual meeting of the council. The committee was composed of Dr. Carl D. Camp, Dr. Douglas Donald, and Dr. James D. Bruce, chairman.

The committee presented its report in February, 1927. It expressed the opinion that the obligation to inaugurate and maintain a program of postgraduate education should be assumed by the University because of its state support. It was further stated in the report:

This does not mean that all postgraduate medical study should be conducted at the University Medical School and Hospital. There are many centers in this state and nation distinguished for special attainments in the various departments of medicine which should be made accessible for postgraduate study, and to which physicians should be recommended and sent for advanced and special work. The University Medical School, in which postgraduate study in medicine is offered and administered, should seek and maintain the closest co-operation with those extramural centers with a view of utilizing their facilities. Physicians in these centers who have distinguished themselves might be invited to become extramural members of the faculty of postgraduate medical instruction. (*Journ. Mich. Med. Soc.*, 26 [1927]: 189-90.)

The committee recommended that a Department of Postgraduate Medicine in the Medical School of the University of Michigan be established to direct these activities. A tentative schedule of study periods was suggested.

The council and the two medical schools were in complete accord with the recommendations. Dean W. H. MacCracken and Dr. A. P. Biddle, representing the Detroit College of Medicine and Surgery, stated that the Detroit College could assume neither direction nor financial support, but promised the co-opera-

tion of its faculty, together with the use of laboratories and buildings, if and when any part of the program should be developed in Detroit. Dr. Little, on the part of the University, promised to place the matter before the Board of Regents with his approval. This he did in a communication to the Board on June 17, 1927, proposing the establishment of a Division of Postgraduate Medicine. In the absence of Regent Sawyer the matter was laid upon the table for consideration at the next meeting of the Board, June 24, at which time the following action was recorded:

The subject of post-graduate medical courses was taken from the table. . . . The Board approved the establishment, within the Medical School, of a Department of Post-Graduate Medicine and named Dr. James D. Bruce as the head thereof, without additional salary, with the provision that during the year 1927-28 a beginning would be made toward placing the work of this department in operation. The organization of the Department of Post-Graduate Medicine is to proceed, under the charge of Dr. Bruce and under the usual conditions governing a department of the Medical School. . . . (*R.P.*, 1926-29, p. 303.)

The direction of the program has been shared since its beginning by committees representing the profession, the Council of the Michigan State Medical Society and the Wayne County Medical Society.

The first postgraduate courses were given May 27 to June 24, 1929, at the Receiving Hospital, Hermann Kiefer Hospital, and Children's Hospital in Detroit. Twenty-four doctors registered for the course in internal medicine and twenty for the surgery course. In 1938-39, the tenth year of this program, fifteen short, intensive courses in various fields of medical practice were given in Detroit and Ann Arbor. Extramural teaching programs of eight days each were given in various centers: Saginaw, Battle

Creek-Kalamazoo jointly, Flint, Grand Rapids, Jackson-Lansing jointly, Traverse City-Cadillac-Manistee-Petoskey jointly, and Ann Arbor. Summer session courses were available to medical practitioners, and during the school year composite courses were arranged upon special request. Doctors were enrolled from approximately one-half of all the cities and towns in the state, as well as from a considerable number of other states. The total registration in courses increased from forty-four in the first year to 2,392 in the tenth year.

Since the inauguration of the postgraduate medical program all the professional schools in the University have engaged in meeting the educational needs of graduates in their respective fields. As a further evidence of the acceptance of this general policy the following is quoted from the recommendations of the University Council to the Regents, which the latter acted upon favorably in August, 1939:

In view of the rapid growth of continuing professional training afforded by various units of the University, as described in the report submitted at the April meeting of the University Council, and in view of the likelihood that there will be pressure for further development of educational opportunities along these lines, it is recommended that a University Committee on Continuing Professional Education be appointed by the

President with the approval of the Board of Regents. The Committee is to consist of representatives of the Schools of Medicine, Law, Dentistry, Education, Business Administration, Forestry and Conservation, Nursing, and Music, of the Colleges of Engineering, Architecture, and Pharmacy, and of the Division of Hygiene and Public Health. In addition, the Dean of the College of Literature, Science, and the Arts, and the Dean of the Horace H. Rackham School of Graduate Studies, or their designated representatives, shall be ex-officio members of the Committee to represent such professional fields as may be embraced within the jurisdiction of their respective units.

The Committee shall be authorized to act through an Executive Committee of not less than five members under such procedure as it may itself establish. The functions of the Committee shall be twofold: (1) to keep itself informed of the experience of the various units, with a view to harmonizing and improving established activities for continuing professional education; and (2) to advise the President, on the basis of this knowledge, concerning the desirability and character of new projects for continuing professional education. This University Committee on Continuing Professional Education is to replace the University Committee on Postgraduate Education authorized by the Board of Regents at its meeting of December, 1933. (R.P., 1939-42, pp. 2-3.)

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* Died September 5, 1946.

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THE DEPARTMENT OF PSYCHIATRY

THE teaching of psychiatry in the Medical School dates from the time of William James Herdman ('72, '75*m*, LL.D. Nashville '97). He was born in Concord, Ohio, on September 7, 1848. In 1875 he became Demonstrator of Anatomy, a position he held for fifteen years. In 1879 he received an additional appointment as Lecturer on Pathological Anatomy, and in 1880 he became Assistant Professor of Pathological Anatomy. Two years later he was made Professor of Practical and Pathological Anatomy. His growing interest in the new field was indicated in 1888 by his change of title to Professor of Practical Anatomy and Diseases of the Nervous System, and Demonstrator of Anatomy. With the change to a four-year course in the Medical Department in 1890, Herdman was assigned to the new chair of nervous diseases and electrotherapeutics, and in 1898, he became Professor of Diseases of the Mind and Nervous System and Electrotherapeutics.

At the time that Herdman was becoming especially interested in this field, Oscar Russell Long (M.D. Detroit Homeopathic Medical College '73, M.D. hon. Michigan '98), of Ionia State Hospital (then termed the Asylum for Insane Criminals), by request, gave a course of lectures on mental diseases before the students of the Homeopathic Medical College, but without expense to the University. The course was repeated in subsequent years.

In 1892 Dr. Jeanne Cady Solis ('92*m*) was made Clinical Assistant to Herdman upon her graduation from the Medical Department and was offered an assistantship in the Department of Nervous Diseases and Electrothera-

peutics. There was evidence of some misgiving regarding the development of the new program. One comment from a qualified observer was that the "Department of Nervous Diseases and Mental Diseases" was well received by other departments, but "with a chip on the shoulder." Nevertheless, the study of both nervous and mental diseases, as well as electrotherapeutics, was included in the departmental program, the actual instruction consisting of a one-hour lecture on Tuesday and Friday and a one-hour quiz on Wednesday, conducted by the assistant. Herdman also held a clinic, from two to five on Wednesdays, when the patients were examined and then presented to the class. The students made no examinations.

Although the course ran throughout the senior year, the lectures covered mental diseases only at the end of the year; in May, interested students were allowed to accompany Herdman and the staff to a state hospital, either Pontiac or Kalamazoo, where they were presented with an afternoon clinic by the hospital superintendent. This activity constituted all of the clinical psychiatric material presented to the class in the early days of the department.

The Regents showed their interest in Herdman's work by requesting him to appear before them in June, 1893, when he "explained the nature of his work, . . ." (*R.P.*, 1891-96, p. 160). During this period, Herdman, who realized from the first the great importance of psychiatry, was active in his advocacy before the legislature of the establishment of a psychopathic hospital at the University. Largely as a result of his efforts, the University obtained, in 1901, an appropriation of \$50,000 for the

construction of a psychopathic hospital in Ann Arbor, to be administered in connection with the University Hospital.

In 1894 Long had been appointed Lecturer on Mental Diseases, without salary, in the Homeopathic Medical College. In the following year he refused an appointment to the professorship of therapeutics and the deanship of the Homeopathic College, but accepted a lectureship of mental and nervous diseases in that college. He held this position until 1914, except for the period 1903-8, when he was Nonresident Lecturer on Mental Diseases. Dr. Solis became Demonstrator of Nervous Diseases in 1897, a position which she held until 1907.

These developments indicate the increasing interest of the University and of the Medical Department in the scientific study of nervous and mental diseases. Dean Vaughan reported to the Regents in 1897 that the asylum boards of the state were proposing to consider the appointment of a pathologist at the University to carry on the pathological work of all the state asylums; and he asked the University on behalf of the boards to send a representative to confer with them on the feasibility of such a project. Vaughan and Regent Hermann Kiefer were appointed as representatives of the University to meet the asylum boards in conference (*R.P.* 1896-1901, p. 128). Consequently, Dr. Theophil Klingmann ('90p, '92m), appointed Assistant to the chair of nervous diseases in 1897, became "Assistant in Pathology for the State Asylums" in January, 1898, with permission to use the microtomes in the Pathological Laboratory when necessary for his work with the state asylums. At this time the Regents also authorized the secretary of the University to have a room in the Pathological Laboratory made ready for Klingmann's use and to supply him with whatever might be

necessary to carry on his work. The position was supported financially by the asylums for the insane, and in 1898 Klingmann was given the title of special pathologist for the asylums. Three years later, he was reappointed to the University staff as Assistant in Diseases of the Mind and Nervous System, but he continued to hold his position with the asylums until 1906.

The Regents approved, in 1898, a recommendation "that the Superintendents of the Asylums of the State, Dr. William Edwards of the Michigan Asylum, Dr. Edward Christian of the Eastern Michigan Asylum, Dr. James Munson of the Northern Asylum, and Dr. Bell of the Northern Peninsula Asylum, be appointed Special Lecturers upon Mental Diseases, provided these gentlemen consent to give one or more special lectures each, the University paying their actual expenses while giving these lectures" (*R.P.*, 1896-1901, pp. 224-25).

The efforts in the development of a program in nervous and mental diseases under Herdman's leadership through the years subsequent to 1890 resulted in a gradual extension of the time given to the subject, although the chief emphasis was on electrotherapeutics and neurological disorders. Electrotherapy as then practiced was primarily suggestive, a type of psychotherapy which could thus well be considered in the field of psychiatry as defined today, but the specific type of treatment employed during the formative years of the department has given way to other methods.

In 1900 electrotherapeutics, included as part of the regular medical curriculum, was given daily for nine weeks of the junior year. Clinical demonstrations were given four times weekly during this period. In addition, supplementary weekly clinics were offered in the senior year. Optional courses, such as one in

physiological psychology given by Professor Walter B. Pillsbury, of the Department of Literature, Science, and the Arts, were also listed. As early as 1893 the seniors attended annual clinics in each of the two state hospitals, and small sections of seniors were assigned to psychiatric wards for special study of individual cases, which were presented for discussion by the class and staff. Each of these smaller sections lasted five weeks.

Agitation for a state psychopathic hospital in Ann Arbor developed rapidly, and in May, 1901, the Regents passed a resolution declaring that they were "willing to accept the administration and control of the Psychopathic Hospital provided for by a recent act of the Legislature, in case it involves no expense to the University" (*R.P.*, 1896-1901, p. 638). A month later, Regents George Alexander Farr and Hermann Kiefer met with the medical faculty to consider the design of the building and the management of the hospital. President Angell, in his report for 1900-1901, stated: "In this ward opportunity will be furnished to our medical students to study some of the problems of alienism. This is a consideration of much importance. . . ." The building was started in October, 1902, and in June, 1905, Regents Lawton, Carey, and Knappen "were appointed a committee to meet the Asylum Boards and devise a plan for operating and managing the Psychopathic Ward in conformity with the State law [of 1905]" (*R.P.*, 1901-6, p. 561).

In September, 1905, the asylum trustees and the committee of the Board of Regents were empowered to employ Albert Moore Barrett (Iowa '93, M.D. *ibid.* '95) as "Pathologist of the State Asylums for the Insane and Associate Professor of Neural Pathology in the Psychopathic Ward upon the hospital grounds of the State University" (*R.P.*

1901-6, p. 606). Barrett had been physician and pathologist of the Danvers Insane Hospital in Massachusetts from 1902 to 1905, and from 1905 until he came to Michigan, in January, 1906, had been an assistant in neurological pathology in the Harvard Medical School.

The new hospital was opened on February 7, 1906 (*Hosp. Rept.*, 1903-8, p. 61), and Barrett's first report was received six months later. In December, 1906, Dr. Herdman died in Maryland while on leave of absence from the University. In February, 1907, on recommendation of the hospital committee of the medical faculty, Barrett became "Professor of Psychiatry and Diseases of the Nervous System, and [was] charged with the immediate care of the clinic of Nervous Diseases, without salary from the University. . . ." (*R.P.*, 1906-10, p. 68). At the same time it was voted that a clinical professor of nervous diseases be appointed, and the following June, upon Barrett's recommendation, Carl Dudley Camp (M.D. Pennsylvania '02) was appointed to this position. Klingmann was made Demonstrator of Nervous Diseases, and Vernon Justin Willey (Michigan Agricultural College '93, A.M. Michigan '02, *ibid.* '09m) became Instructor in Electrotherapeutics and Director of the X-ray Laboratory. In 1908 Albert Barlow Hale ('82, M.D. Northwestern '86, M.D. Strassburg '87) was appointed Assistant in the Roentgen Laboratory. George Milton Kline ('01m, A.M. hon. '31), later commissioner of the Department of Mental Diseases in Massachusetts, and Melvin John Rowe ('03m) were appointed as assistants in psychiatry; Donald Dinnie Johnston ('08m) was made Intern in the Neurological Service of the Hospital.

In March, 1920, the Department of Diseases of the Mind and Nervous System was divided into the Department of Psychiatry and the Department of Neu-

rology. Barrett's title was changed to Professor of Psychiatry, and Camp became Professor of Neurology (*R.P.*, 1917-20, p. 896).

It is interesting to note that the *Announcement* of the Medical Department lists electrotherapeutics for a period of more than thirty years as a compulsory and time-consuming course. In the *University Calendar* and in the *Announcement* of the Medical Department it was repeatedly stated: "For the treatment of diseases of the nervous system, the hospital is furnished with apparatus for generating all kinds of electric current. Attendants especially skilled in the application of electricity and massage are put in charge of these cases."

In the years since the introduction of neurology and psychiatry into the program of the Department of Medicine and Surgery there has been a gradual increase in the amount of teaching time allotted to these subjects, an indication of the increasing importance of psychiatry in medical education. In addition to a sophomore course in psychopathology and a junior course in psychiatry, a freshman course in medical psychology was given in the period 1930-38. In 1938 this course was increased from eight to sixteen hours and became a required subject. The senior students were taught psychiatry in sections.

From 1907 to 1936 Dr. Barrett continued in charge of the department and as head of the Psychopathic Hospital. During this period many important contributions to the development of the science of psychiatry were made by him and by those associated with him (see Part II: NEUROPSYCHIATRIC INSTITUTE), and many advances were made in the teaching of the subject. A laboratory of neuropathology had been in use for a number of years, and the subject was taught in the Medical Department by Barrett. Under his supervision the labo-

ratory became an important part of the Psychopathic Hospital. According to Michigan statutes, it was designated the Central Laboratory of Neuropathology for the State Hospitals. Konstantin Scharenberg (M.D. Hamburg '22) has been in charge of the laboratory since 1930, and during this time many important publications have been issued. The state hospital groups have provided an important source of material, particularly the institutions at Caro and Lapeer, and the superintendents of the state hospitals have been very co-operative in making material available.

In 1936 Raymond Walter Waggoner ('24m, Sc.D. Pennsylvania '30) was appointed Professor of Psychiatry and chairman of the department. He assumed office on January 1, 1937, and has continued in that position. The completion of the Neuropsychiatric Institute building in 1939, situated directly at the rear of the University Hospital and connected with it by a corridor, has permitted a much greater co-ordination of psychiatric teaching than was possible when the psychiatric unit was a separate building and has enabled students to have a much closer association with the patients.

The appointment of a psychiatrist as a consultant on a par with the internist and surgeon in the office of the surgeon general in Washington was evidence of the increasing recognition of the importance of psychiatry in military medicine. This trend is borne out by the manifestation of greater interest in the subject of psychiatry by Medical School students.

As a result of the close relationship between the Neuropsychiatric Institute and the various state hospitals, a program of clinics conducted by members of the staff of the Neuropsychiatric Institute was begun in the state institutions in 1937. At these clinics patients selected by the state hospital staffs were exam-

ined and discussed by members of both the institute and hospital staffs. The neuropathologist from the institute discussed the pathology of cases, the material of which had been received from the state hospital where the clinic was being held. The practice has been described by state hospital superintendents as a valuable addition to the teaching activities of the state hospital group.

From time to time members of the state hospital staffs come to the Neuropsychiatric Institute for a period of intensive postgraduate study; an opportunity is afforded them for graduate work in neuroanatomy and neuropathology, as well as for clinical work in psychiatry and neurology. As a part of the graduate teaching program, short postgraduate courses are held to prepare applicants for their examinations for the diplomate in the American Board of Psychiatry and Neurology. Some of the

courses in the Medical School are also utilized by the Graduate School of the University for students qualified to register for the courses. This applies particularly to those students who have a significant background of psychological or sociological training.

Since 1937 some reorganization of the department has taken place, and the graduate program as it applies to interns, assistant residents, residents, and instructors is the same as it is for other departments. During the training period opportunity is afforded those who are properly qualified to do extra work necessary to obtain the degree of master of science in psychiatry or in psychiatry and neurology. Thus, there has been established an excellent postgraduate training program for those who desire to specialize in this field.

RAYMOND W. WAGGONER

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THE DEPARTMENT OF ROENTGENOLOGY

THE Department of Roentgenology was officially created by the Regents in July, 1913, when a budget of \$1,000 for current expenses was allocated to it and an additional \$360 was appropriated for repairs in the X-ray quarters in the Hospital. Long before, however, the medical application of Roentgen rays at the University had been begun, and it was the importance which activities in this field eventually assumed that culminated in the establishment of a separate department.

On April 26, 1896, only five months after the announcement of Roentgen's discovery, occurred the first recorded medical use of the newly described "X rays" at the University. Mr. Stanislas M. Keenan, of Eloise Hospital, who had become interested in Professor Henry S. Carhart's work with X rays, brought to Ann Arbor a patient with a bullet in his foot. Using X rays produced in the Physics Laboratory, Professor Carhart and Dr. William James Herdman ('72, '75m, LL.D. Nashville '97), Professor of Diseases of the Mind and Nervous System and of Electrotherapeutics, photographed the foot and demonstrated the presence of an opaque foreign body.

At that time there was no X-ray equipment at the University Hospital, but Herdman, who for some years had conducted a course in electrotherapeutics begun by Professor John W. Langley in 1880, was in the habit of demonstrating to his students with the static machine in his office the production of X rays and their medical uses. Sometime about 1900 the first piece of equipment for the production of X rays in the Hospital was purchased personally by Dr. Charles B. G. De Nancrede and Dr. Cyrenus G.

Darling. This original induction coil was preserved by Dr. D. Murray Cowie and sometime before his death was presented to the Department of Roentgenology. X rays were first mentioned in the *University Calendar* in 1901-2, in a revised description of the electrotherapeutical laboratory. The late C. Perry Briggs, for many years Pharmacist of the University Hospital, is credited with having developed the technique employed during the early years when the original equipment was in use, having first familiarized himself with the subject in the laboratory of Professor Carhart.

The first X-ray equipment purchased with University funds was acquired in 1903 with \$1,000 appropriated by the Regents (*R.P.*, 1901-6, p. 65). This apparatus was placed in the custody of the Department of the Diseases of the Mind and Nervous System and Electrotherapeutics, then directed by Herdman, and a small X-ray laboratory was set up in the basement of the Palmer Ward building. Additional small appropriations were authorized by the Regents from time to time, the "Treasurer's Report" of June 30, 1907, listing an expenditure of \$514.63 for the Roentgen Laboratory during that fiscal year.

Vernon Justin Willey (Michigan Agricultural College '93, A.M. Michigan '02, *ibid.* '09m), appointed Instructor in Electrotherapeutics in 1901, was given the additional title of Director of the Roentgen Laboratory in 1906, and in the same year Almus A. Hale was appointed his assistant in the laboratory and clinical photographer. Willey continued in charge of the laboratory, after attaining considerable prominence in the field of roentgenology, until 1909, when he resigned to join the staff of the Mayo clinic.

In 1907 Carl Dudley Camp (M.D. Pennsylvania '02) was appointed Clinical Professor of Diseases of the Nervous System and assumed immediate supervision of electrotherapeutics and consequently of the Roentgen Laboratory, and Dr. James Gerrit Van Zwaluwenburg ('98, '08*m*), later identified with the work in roentgenology at the University, was appointed second assistant in internal medicine. Through close association with Almus Hale, Van Zwaluwenburg became deeply interested in the clinical use of Roentgen rays.

During the two years after the resignation of Willey in June, 1909, Lyle Steen Hill ('08*t*, M.D. Detroit College of Medicine and Surgery '14), previously an assistant in the electrotherapeutics laboratory, was Director of the Roentgen Laboratory. Van Zwaluwenburg, who was made Instructor in Internal Medicine and Demonstrator of Clinical Medicine upon the resignation of Dr. Frank Smithies in 1908, took a special interest in the use of X rays in examinations of the heart and of the stomach. His interest, combined with the desire of De Nancrède, of the surgical service, to make greater use of the possibilities of Roentgen apparatus, resulted, early in 1910, in the transfer of the supervision of the laboratory to the departments of Internal Medicine and Surgery, acting jointly. Van Zwaluwenburg took over direct charge of activities, and De Nancrède represented the laboratory in meetings of the faculty. Under the new arrangement, X-ray examinations were becoming so numerous that the Regents established an X-ray fee schedule in September, 1912.

When the full-fledged Department of Roentgenology was established in July, 1913, Van Zwaluwenburg was chosen as the first Clinical Professor of Roentgenology. He brought to this newly developed clinical specialty of the Uni-

versity a rare combination of background and point of view admirably suited to the work in hand. His preliminary training in engineering, his sound grasp of internal medicine, and his inquisitive attitude all came into play in the development and firm establishment of roentgenological methods in the clinical activities of the Hospital. "Van," as he is affectionately remembered by colleagues, assistants, and students, rapidly attained a national reputation in his field through his energetic and untiring efforts as a Roentgen diagnostician, a teacher, and an investigator; and, in recognition of his accomplishments, the Regents appointed him Professor of Roentgenology in July, 1917. During the war the new department, in conjunction with the United States Army and the Michigan Antituberculosis Society, took an active part in the examination of men discharged from Camp Custer because of suspected tuberculosis.

From correspondence and reports of the period, the need for additional equipment to meet increasing clinical demands appears to have been ever present. There was but a single generator, a ten-kilowatt high-tension transformer, one radiological table with a tube stand, and a Groedel fluoroscope with orthodiagraphic attachment. Gas-filled X-ray tubes were costly and unreliable. The number of examinations conducted each year had risen from less than 600 in 1911 to 4,203 in 1917-18, by which time the activities of the department had far outgrown the quarters which it occupied in the basement of the old Palmer Ward. Late in 1918 a separate machine was acquired for the production of medium-voltage X rays to be used therapeutically. A new scale of charges adjusted to the financial status of patients, the adoption of which had been advocated by Van Zwaluwenburg to avoid unfair competition by the University with

private practitioners, was approved by the Regents in 1920.

Heedless of his own personal welfare, unsparingly devoted to medicine, Van Zwaluwenburg died of pneumonia on January 5, 1922, after a very brief illness, and thus the formative period of the department came to an abrupt and untimely end. More than ten thousand X-ray examinations were made by the department in the year of his death. His boundless energy, his wholehearted devotion to clinical roentgenology, his great human kindness, his important contributions to the examination of the heart, of the great vessels, and of the organs of the abdomen by Roentgen methods, and his insistence that Roentgen diagnosis of disease must be primarily objective led American roentgenologists to regard him as one of this country's outstanding pioneers in his field.

After Van Zwaluwenburg's death the Regents placed Samuel Wright Donaldson (Tennessee '12, Michigan '16m), a senior assistant, in temporary charge of the department. Donaldson was assisted by Elmer Forrest Merrill ('20m) and later by Clyde Knapp Hasley ('15, '18m), formerly an instructor in dermatology.

Preston Manasseh Hickey ('88, M.D. Detroit College of Medicine '92) was appointed Professor of Roentgenology in the fall of 1922. An outstanding clinician of Detroit, Hickey had previously been a professor of pathology and otolaryngology in the Detroit College of Medicine and Surgery and had won international acclaim as a roentgenologist. His interest in the subject had developed from his hobby—photography. Together with Dr. Augustus Warren Crane, of Kalamazoo, Dr. Henry Hulst, of Grand Rapids, Dr. James Case, of Battle Creek, and Dr. J. G. Van Zwaluwenburg, Hickey had already achieved rec-

ognition as one of the five great Michigan radiologists who had distinguished themselves in the early years of roentgenology.

During the war years Hickey had rendered unusual service to the Army Medical Corps by participating in the organization of specialty schools for roentgenologists and by serving as chief consulting roentgenologist to the American Expeditionary Forces. Outstanding pioneers in roentgenology in England, France, Sweden, Germany, Italy, Austria, and Canada were his personal friends. He founded the *American Quarterly of Roentgenology* in 1906 and for ten years was editor of this publication, which in the meantime (1913) became the *American Journal of Roentgenology*. With this rich background he was ideally equipped to be a teacher of roentgenology, and as such he is remembered and revered.

Under Hickey's forceful guidance the department expanded rapidly. From his appointment in 1922 until the new University Hospital was occupied in August, 1925, he devoted much time and attention to planning the new quarters for the department. High-voltage therapy equipment was installed temporarily in the basement of the Palmer Ward. The professorial staff of the department was enlarged in April, 1925, when Ernst Albert Pohle (M.D. Frankfurt [Germany] '20, Ph.D. Michigan '28) took up his duties as Assistant Professor of Roentgenology and was placed in charge of the work in radiation therapy. In August, 1925, the Department of Roentgenology was moved into spacious new quarters in the present Hospital building (Hickey, pp. 113-25).

Clinical photography, a hospital activity of constantly growing importance, had been fostered first by Van Zwaluwenburg and then by Hickey as a part of the Department of Roentgenology.

When the new Hospital was opened, Harry Franklin Minkley, a former commercial photographer, was placed in direct charge of this work in the new studio provided for the purpose. Burr Anderson, technician for many years, resigned in 1925, and the technical work was distributed among assistant residents assigned to the department—an important feature of the training program instituted by Dr. Hickey.

Instructional and research activities were materially accelerated during Hickey's incumbency; interdepartmental clinical conferences were established, and formalized teaching of roentgenology to undergraduates was further developed and extended. There was an increase in the number of graduate students, most of whom remained for two years of post-graduate instruction after their internship. Other physicians holding fellowships from various national foundations were attracted to the department.

The first radium owned by the department was purchased in 1928. Previously, the only stocks available had been owned privately by members of the faculty, or had been rented.

In 1927 Pohle had been promoted to an associate professorship in recognition of his experimentation with ultraviolet light, high-frequency currents, X rays, and the radiations of radium. Before Pohle's departure in 1928 these activities led to the formation of a subdepartment of physical therapy, later combined with the physiotherapy section of the Department of Surgery. Closely adjacent to the Department of Roentgenology was the work in hydrotherapy and in electrotherapy, supervised by Dr. Hickey and conducted by Willis Seamans Peck (Syracuse '22, M.D. *ibid.* '24), who in July, 1928, had become Instructor in Physical Therapy, Assistant Director of the Department of Physical Therapy of the University Hospital, and part-time

physiotherapist in the Health Service. In March, 1929, all physical therapy activities were amalgamated to form a new department of the Medical School (R.P., 1926-29, pp. 939, 1020), administered by Dr. Hickey and an advisory committee consisting of Dr. Warthin and Dr. Huber. Courses for medical students and technicians served as models for similar work in other institutions.

Hickey's intensely active and valuable service to the University came to a close with his death on October 30, 1930. Because of his gentle kindness, he will long be referred to by former assistants, students, and colleagues as "Pop" Hickey—a form of endearment accurately expressing the character of his relationship to a large band of physicians. Hickey's influence upon American roentgenology was nation-wide, and he earned recognition for the University as an outstanding teaching center in this subject. On the wall of what once was his private office hangs a memorial bronze bas-relief presented by his associates in the name of the American Roentgen Ray Society as a testimonial to his eminence in American medicine.

Carleton Barnhart Peirce ('20, '24m, M.S. '27) was appointed Acting Director of the Department of Roentgenology immediately after the death of Dr. Hickey, under whom he had begun his specialized training in 1926 as an instructor. He had resigned to take a position at the University of Nebraska, but returned early in 1929 as Assistant Professor of Roentgenology, relieving Carl Lewis Gillies ('26m), who left to become an associate professor of roentgenology at the University of Iowa. In 1928 Dr. Pohle resigned to accept a professorship of roentgenology at the University of Wisconsin, and until 1930 the work in radiation therapy was supervised by John McGregor Barnes (B.S. Med. '24, '24m), Instructor and later Assistant Professor,

whose colleague and successor, William Macauley Gilmore (M.D. University of Western Ontario '27), was in charge of this work at the time of Hickey's death. Dr. Gilmore was in turn succeeded by Daniel Maurice Clark (M.D. Minnesota '27), who supervised the work in radiation therapy during the first three months of 1931.

On January 23, 1931, the Regents appointed Fred Jenner Hodges (Wisconsin '17, M.D. Washington University [St. Louis] '19) Professor of Roentgenology, effective April 1. Hodges had been a lecturer in roentgenology at the University of Wisconsin and roentgenologist to Saint Mary's Hospital and to the Wisconsin Memorial Hospital in Madison. Vincent Clifton Johnson (M.D. Wisconsin '27), who was Associate Professor in 1940, was appointed Instructor in Roentgenology July 1, 1931. Peirce became Associate Professor in 1933 and continued in that capacity until, in 1938, he resigned to succeed Dr. Howard Pirie at the Montreal General Hospital.

Harold William Jacox (B.S. Med. '26, '28m), just completing his specialized training, was placed in charge of the work in radiation therapy in 1931. He resigned as Assistant Professor of Roentgenology in December, 1935, to become radiation therapist to the Western Pennsylvania Hospital, Pittsburgh, and Willis Peck, who had been Assistant Professor of Physical Therapy since 1931, succeeded him. In September, 1937, Dr. Peck was transferred to an assistant professorship of roentgenology, and he continued in diagnostic and later in therapeutic roentgenology until September, 1939, when he entered practice in Toledo.

At the time of Hickey's death the splendid plant conceived and developed under his direction had been outgrown because of increasing departmental activities, and in the next year, 1931, it was extensively repaired and altered. An

additional four hundred square feet of floor space was acquired by the transfer of the medical illustrator's quarters to another part of the Hospital. The highly specialized departmental activities were provided for by the careful subdivision of floor space and by the acquisition of new equipment. Dental roentgenology was transferred to the oral surgery service, a fluoroscope was installed in the newly opened Tuberculosis Unit of the Hospital, and filming for urological diagnosis was provided for in the urology outpatient quarters. On April 4, 1932, about fourteen months after the appointment of Professor Hodges, the redesigned departmental quarters became available. In the interim the varied activities had been conducted under most trying conditions in temporary quarters on the ground and basement floors. For the first time there were well-arranged facilities for patients needing radiation therapy. These activities had been constantly increasing until patient visits had reached the total of 9,446 annually. In July, 1935, the medium- and high-voltage machines which had been transferred from the old Hospital ten years before were replaced with shockproofed 200-kilovolt instruments, and in the following year, because of the constantly increasing number of cancer patients, equipment limited to the treatment of superficial skin lesions was provided in the dermatology outpatient quarters.

In the 1932 reorganization the work in clinical photography ceased to be a subsection of the Department of Roentgenology, and all hydrotherapeutic and electrotherapeutic activities were united to constitute a subdepartment of physical therapy, which was later, in 1937, transferred to the Department of Surgery. In the meantime, many somewhat disconnected activities in this field had been brought together in quarters specially developed for them on the base-

ment floor of the southeast wing of the main Hospital. An exercise pool for poliomyelitis patients, contributed by the Rackham Foundation, was built. After the remodeling of 1935, when the adjoining Hospital stores addition was erected, the department was better able not only to carry its ever-increasing clinical load efficiently, but also to provide greater opportunities for its graduate and undergraduate students. An entirely new method of case reporting, film filing, and cross indexing was established, and the departmental business office, film-processing facilities, film storage, and viewing rooms for the staff were brought into close proximity to conserve effort and permit rapid service. Dressing rooms for the specialized technical branches in therapy and diagnosis were installed close to the exposure rooms, and transformers were housed in closed lofts to conserve floor space. A student laboratory for the demonstration of X-ray physics was built and equipped, and one room was utilized for a departmental library designated as the Hickey Memorial Library and maintained largely by Dr. Hickey's bequest of \$1,000.

The teaching of roentgenology has also been changed since 1932. Previous efforts to train nonmedical technicians were discontinued in order that undergraduate and graduate medical students might be more thoroughly trained in roentgenology. In a typical year, 1939-40, thirty-two hours of lectures for juniors were offered in the first semester, augmented by thirty-two hours of required clinical instruction conducted on the block system throughout the year. Several courses were discontinued as electives and were replaced by a six-week summer course of intensive laboratory, lecture, and clinical instruction open to students and practitioners alike.

The plan of interdepartmental clinical

conferences already instituted was materially expanded. In 1933 the program for postgraduate students in roentgenology was revised and was placed upon a three-year-training basis. Carefully selected medical graduates who had completed a year of internship were accepted as assistant residents in roentgenology, eligible for reappointment for a second year as residents and for a third year as instructors. Modest stipends provided by the Hospital and the University made it possible for more than forty young men of limited means to obtain this training in the next ten years. The plan previously in vogue, of delegating trainees in rotation to a month's service at Detroit Receiving Hospital, outgrew its usefulness and was discontinued in 1933.

Some ten nonprofessional workers brought together under Hickey's direction before 1931 readjusted themselves to the rapidly changing conditions and, with but few exceptions, remained in the employ of the department. They have contributed greatly to the successful provision of roentgenological service to the University Hospital, as have the less numerous veteran workers in physical therapy.

The Department of Roentgenology has assisted in the extensive reorganization of the general Hospital records since 1932 by actively participating in the development of a mechanical tabulation system.

The department has made important contributions to the establishment and maintenance of the concerted program of the University's cancer committee, having taken an active part in the two tumor conferences conducted by the Department of Obstetrics and Gynecology and in the two general tumor conferences held each week in conjunction with the departments of Pathology and Surgery. In succession, Dr. Jacox, Dr. Peck, and

Dr. Isadore Lampe (Western Reserve '27, M.D. *ibid.* '31, Ph.D. Michigan '38), who became Assistant Professor of Roentgenology in 1938, have served energetically and efficiently in this field. In association with the Department of Physics, the Department of Roentgenology began to participate in 1935 in the University's nuclear physics program centered about the construction of the University's cyclotron and its subsequent employment in research. As an outgrowth of this venture, which was supported by the National Cancer Institute and the Rackham Foundation, both Lampe and Hodges have been associated with Professor E. O. Lawrence and the radiation laboratory at the University of California, where Hodges served as a research associate while on sabbatical leave for one semester.

Interested in the broad-scale investigation of the incidence of pulmonary disease in general, the departments of Roentgenology and Internal Medicine have since 1931 been actively concerned with various mass surveys. As a result, a periodic X-ray chest examination has become a routine practice for all Hospital employees as well as for all students entering the University. In June, 1935, chest filming of all patients registering at the University clinics during a two-week trial period proved convincingly that this procedure should be instituted, but it was not until July, 1941, that, through the financial assistance of the Kellogg Foundation, a plan of chest survey based upon the use of photo-fluorography was put into effect. Facilities were installed in the Hospital admission office, and during the first twelve months nearly 23,000 patients were so examined, of which 10 per cent showed sufficient evidence of intrathoracic ab-

normality to warrant more extensive X-ray examination.

Charged with the supervision of the X-ray activities at the University Health Service, the Department of Roentgenology took an active part in the planning of the X-ray Laboratory in the new Health Service Building, completed in 1939, and has provided medical supervision of the work of this laboratory.

The Neuropsychiatric Institute building, long under contemplation, was finally opened for patients in April, 1939. Direct communication with the main Hospital building made it necessary to alter the central section of the X-ray quarters materially to provide a corridor thoroughfare. As a by-product of this remodeling, the business office of the department was enlarged, and space for the stenographic staff and for film-interpretation facilities was added.

The amount of work in the Department of Roentgenology has steadily increased, the annual number of patient visits having risen from 33,803 in 1932-33 to 54,750 in 1938-39.

Since the private purchase of primitive X-ray equipment by De Nancrède and Darling in 1900, the medical use of X rays at the University has undergone a phenomenal and constantly accelerated development, naturally divisible into four major periods—the formative period before 1913 and the three administrations of Van Zwaluwenburg, Hickey, and Hodges as professors of roentgenology and heads of the department. New and immature as a full-fledged clinical department of the Medical School, the Department of Roentgenology has risen to a position of unquestioned importance in a relatively short period.

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CARLETON B. PEIRCE

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THE DEPARTMENT OF SURGERY

WE have the word of Dr. Corydon L. Ford for the fact that the first Professor of Surgery in the Medical School, Moses Gunn, foresaw the establishment of the Medical Department in the University and hurried to Ann Arbor on the day following his graduation from Geneva College in 1846 to be available for appointment. It is also stated, without substantiation, however, that he brought a cadaver with him in a trunk from Geneva, New York, by stagecoach through Canada and used this anatomical material for teaching anatomy and surgery, obviously in an extramural fashion, as soon as he arrived in Ann Arbor.

Moses Gunn (M.D. Geneva Medical College [N. Y.] '46, A.M. *ibid.* '56, LL.D. Chicago '67) was born in East Bloomfield, New York, in 1822. After completing his early education in the local academy he spent some years in the office of Dr. Edson Carr in Canandaigua studying medicine. In 1844, at the age of twenty-two, he enrolled as a member of the medical class in Geneva College, where he became an assistant in anatomy

to Corydon L. Ford, his roommate and later his associate on the Michigan medical faculty. After coming to Ann Arbor, he seems to have established a busy general practice, especially among the Germans, for he could speak that language. He described the long, arduous drives through the country on poor dirt roads while making his calls, but he did not mention any teaching activities prior to his connection with the University (Jane Gunn, *Memorial Sketches*, pp. 23-60).

Abram Sager and Silas Hamilton Douglass were the first members of the medical faculty. They were appointed in 1848, and in July, 1849, Moses Gunn was appointed Professor of Anatomy, with the understanding that he would teach surgery as well. The Department of Medicine and Surgery did not open its doors to students, however, until October, 1850, the first class having the surprising number of ninety-one students. Before the school opened Gunn spent several months in New York, Philadelphia, and Boston preparing for his new duties. When it was decided to separate the chairs of anatomy and

surgery in 1854 Gunn became Professor of Surgery, and his friend of Geneva days, Corydon L. Ford, was made Professor of Anatomy, undoubtedly at Gunn's suggestion.

Aside from the weekly clinical class, at which patients might present themselves for free treatment by the professor, on condition that students be permitted to witness it, the teaching of surgery was at first entirely didactic, and Moses Gunn is said to have been a forceful, enthusiastic lecturer and an outstanding teacher. Well-groomed, dignified and handsome, full of energy and self-confidence, he was a distinguished mentor held in high regard by pupils and the medical profession. In 1853 he moved to Detroit, where he maintained a general practice, coming to Ann Arbor twice a week to deliver his lectures on surgery. In September, 1861, he joined the Army of the Potomac as surgeon to the Fifth Michigan Regiment. A three-week leave enabled him, apparently, to give his fifty lectures and return to the army. He was with McClellan's army in the Peninsular campaign and in July cared for the wounded at Gettysburg. Exposure and overwork brought about his return to Detroit, and there he remained until 1867, when he resigned to take the chair of surgery in Rush Medical College.

The contributions he made to surgery and medical science while he was in Ann Arbor were more personal than scientific. As a coeditor of the *Medical Independent* and its successor, the *Peninsular and Independent Medical Journal*, he made numerous case reports, but his sole original work was a study of the mechanism of dislocation of the hip, carried out on the cadaver. This work remained his chief surgical hobby, and he insisted on the correct surgical principle of intelligent, gentle manipulation for reduction of the dislocated hip as opposed to the

crude, forcible traction used by his surgical predecessors. Gunn's greatest contribution to medicine was his teaching. By his insistence that medicine should be treated as a science he aided in raising the standard of medical education and practice.

After Gunn's resignation, William Warren Greene ('55m), of Boston, was appointed Professor of Civil and Military Surgery in 1867, but he served for only a year. He was succeeded by Henry Francis Lehunte Lyster ('58, '60m, A.M. '61). Dr. Lyster also served for only one year, since he did not feel that he could give up a good practice in Detroit to reside in Ann Arbor, as was necessitated by a new ruling of the Board of Regents, but he returned some time later and for two years had charge of the Department of the Theory and Practice of Medicine.

Alpheus Benning Crosby (Dartmouth '53, A.M. and M.D. *ibid.* '56), whose father, Dr. Dixi Crosby, at one time held the professorship of surgery at Dartmouth College, followed Lyster, first as Lecturer on Surgery in 1869 and the next year as Professor. Crosby had previously taught surgery at the University of Vermont and had become an intimate friend of its president, James B. Angell, whose correspondence with him concerning the Regents' offer of the Michigan presidency to Angell was amusing and instructive (*Vermont to Michigan*, pp. 167-68, 216-19). Though Angell decided to accept the Michigan offer, Crosby resigned his Michigan post in 1871 to take the chair of surgery at Dartmouth made vacant by the retirement of his father. Dr. Crosby died at the age of forty-five, with the reputation of being one of the best teachers and surgeons of his years in the country.

Dr. Reuben Peterson, in his account of University Hospital, recorded a legend concerning Dr. Crosby, who is said to

have asked the faculty to reduce his lecture and quiz hours, for he felt he could use his and the students' time more profitably. This was rank heresy, according to Peterson, and the request was refused, whereupon Crosby promptly resigned. The Regents obviously felt that the way to teach medicine was almost entirely by the spoken word, and many years were to elapse before a more well-rounded system became firmly established. During his incumbency, Crosby, as a member of the faculty committee on the Hospital, signed the first annual report of the Hospital to the Regents.

Theodore Andrews McGraw ('59, M.D. Columbia '63, LL.D. Michigan '05), of Detroit, followed Crosby as Lecturer in Surgery. His work in the little Chemical Laboratory in the University had turned his interest toward scientific studies, and this interest led him eventually to complete his medical education at the University of Bonn. After a period of service as assistant surgeon in the Civil War he returned to Detroit and helped found the Detroit College of Medicine in 1869. The inadequacy of hospital facilities in the University led to his withdrawal from the faculty when he had delivered but one course of lectures. His subsequent career was highly distinguished, and he became a national figure because of his pioneer work in abdominal surgery, particularly intestinal anastomosis. An address which he delivered before the section of surgery and anatomy of the American Medical Association in 1891, concerning the use of the elastic ligature in the surgery of the intestines, gave him an international reputation. His success in teaching is attested by the large number of able men who obtained from him their early training and their enthusiasm for surgery, and by the almost idolatrous worship they had for him. He always advocated longer and more careful training for surgeons and

condemned the attempt to operate without sufficient training and education. He died in Detroit in 1921 at the age of eighty-two.

The succession of short tenures in the chair of surgery ended with the calling of Donald Maclean (M.D. and C.M. Edinburgh '62), one of the most notable personalities and teachers to serve the University in this position. He was born at Seymour, Canada, in 1839. His education was varied; after attending Oliphant's School in Edinburgh, Scotland, from 1845 to 1851, he completed his pre-college education in Canada. He entered Queen's University at Kingston, Ontario, in 1855, but left two years later to take up his residence at Edinburgh University Medical College. There he was, for a period, assistant to Syme, then one of the world's renowned surgeons, and he became acquainted with Lister and his work.

On his return to America in 1863, Maclean entered the Union Army as assistant surgeon and served creditably until 1864, when he was called to the chair of clinical surgery of the Royal College of Physicians and Surgeons at Queen's College, Ontario—a position which he left five years later because of ill-health. After maintaining a private practice in Kingston for a few years he accepted appointment as Lecturer on Surgery at the University of Michigan in 1872. In the following year, when he was but thirty-four years old, he was promoted to the professorship of surgery.

He was a man of spare build and average height, with sandy hair, blue eyes, rapid movement, and a kindly and magnetic personality. His manner was, however, markedly fluid and volatile and made him staunch friends of some and bitter enemies of others. He had no sympathy for quackery. His antipathy for homeopathic medicine, which was gaining marked headway in Michigan, as in

other sections of the country, was so violent that when that system was recognized by the University and a homeopathic school was established, the alterations in University faculty meetings were in part not printable. Even though Maclean did not live to see the downfall of the homeopathic system, the fact that it is no longer taught in the University is a tribute to his foresight.

Dr. William J. Mayo, a student of Maclean's at Michigan, said:

Maclean was in the prime of life, vigorous, not a fluent speaker, but a forceful one, and one of the best surgeons of his generation and day. He was a fine diagnostician and a courageous, skillful, and conscientious operator.

In my Junior year at Ann Arbor, Maclean was trying out the merit of the carbolic acid spray which Lister had introduced to prevent surgical infection. From it he developed a toxic absorption of carbolic acid, with bloody urine and related manifestations, as a result of which he was confined to his bed for several weeks. Thereafter, the carbolic acid spray was discontinued, but he was always *cleanly in his work*, and one could see that he had *early Listerian principles in mind*. . . . As I progressed in surgery after leaving Ann Arbor, and attending schools and clinics both at home and abroad, I realized more and more fully that Maclean was an outstanding surgical teacher. (Letter, Jan. 19, 1937, to Dr. Frederick A. Collier.)

This description of his teacher by one of the eminent surgeons of the century indicates Maclean's great worth.

Maclean was not an investigator, and his numerous publications were clinical observations only. However, at the author's request, he brought out an American edition of Syme's *Surgery* (1866) which was well received in this country.

After serving the University for seventeen years he attempted to have the clinical departments of the Medical Department moved to Detroit. When this

proved unsuccessful, he resigned to begin the practice of surgery in that city. For twenty years he was surgeon-in-chief for the Michigan Central and the Grand Trunk railroads. During this period he hastened the evolution of the Michigan State Medical Society from a mere convention with political methods into a society for mutual instruction and scientific betterment. At the outbreak of the war with Spain, he again entered military service and for the war's duration was stationed at Old Point Comfort, Virginia, as surgeon in the United States Army.

Maclean's real worth to the school and to the medical profession may be summed up in the words of W. J. Mayo:

I have always been very happy that I had the privilege of attending the University of Michigan, and I cherish the memories of my association with the men of the faculty. Especially do I recall with gratitude and affection Donald Maclean, who stimulated and sustained my enthusiasm and love for the science and art of surgery. (Letter, Jan. 19, 1937, to Dr. Frederick A. Collier.)

Maclean was followed by Charles Beylard Guérard De Nancrède (M.D. Pennsylvania '69, M.D. Jefferson Medical College '83, A.B. hon. Pennsylvania '92 [as of the class of 1868], A.M. hon. Michigan '93, LL.D. Michigan '19). De Nancrède was born in Philadelphia in 1847. His grandfather first came to this country as a lieutenant in the French Army under Rochambeau. He went back to France, but returned to this continent in 1785. Because of the intense republican feeling at that time, he dropped the "de" from his name, but it was restored by his grandson about 1905, when the University *Calendar* first gave the name of Charles De Nancrède.

His early life was spent in a cultured home, and his early education, fundamentally classical, was acquired in private schools in Philadelphia. He at-

tended a military academy and, after two years in a general arts and science course at the University of Pennsylvania, entered upon the study of medicine. He began his teaching career while he was a student in the Medical Department of the University of Pennsylvania, as an assistant in physiology in the University and also in the Philadelphia Dental College. After a year's internship in the Protestant Episcopal Hospital of Philadelphia, he began general practice in that city, but soon entertained a decided preference for surgery. Because of his interest in teaching and the added prestige associated with an academic position, he served as assistant demonstrator of anatomy at his alma mater for more than a decade after 1871, and later as a lecturer on regional anatomy and demonstrator of osteosynsdesmology, a position he held until his call to Michigan in 1889.

He was the first surgeon in Philadelphia to operate upon patients with bullet wounds of the stomach and intestines: his results were good considering the handicaps under which he worked. He also pioneered by attempting to treat cortical epilepsy and cortical abscesses surgically and was one of the first in that city to remove appendices for "inflammation of the bowel."

In addition to being affiliated with the University of Pennsylvania, he acted as attending surgeon at the Episcopal Hospital and as surgeon and clinical lecturer on rectal surgery at Jefferson Medical College Hospital, and as attending surgeon at Saint Christopher's Hospital for Crippled Children. For the year 1871-72 he was chief of the clinic in one of the eye and ear services at the University of Pennsylvania. In 1883 he was appointed surgeon at the Philadelphia Polyclinic, where he later was made an emeritus professor of general and orthopedic surgery.

De Nancrede was called to the chair of surgery at the University of Michigan in 1889. At that time he was a man of forty-two years, described by contemporaries (*Mich. Alum.*, 27 [1921]: 572) as being spare in build, jauntily erect in carriage, nervously quick in movement, meticulously dressed, and overconscious of his own rights and dignities, and therefore inclined to take quick offense at even fancied slights. These qualities were evident in his teaching. His lectures consisted largely of the reiteration of personal experiences, the reading of his work, *Lectures on the Principles of Surgery*, and tirades against certain surgical practices of the time. He firmly believed that inflammation and infection were the same. He championed antiseptic surgery during the early years of the Listerian era, yet, contrary to his usual resistance to policy changes, quickly accepted the tenets of aseptic surgery when they were established.

As a physician, he was gentlemanly, hypersensitive, highly egocentric, hypersollicitous, and very cautious and conservative in applying surgery, as compared with other surgeons of his time. As a surgeon, he was very careful and meticulous, and he had a fine flair for showmanship when being watched from the gallery. An excellent diagnostician, he opposed the then common dangerous practice of exploratory laparotomy as a diagnostic measure, a practice which had come into vogue as soon as it was realized that the abdomen could be relatively safely opened under aseptic precautions.

He was not particularly interested in research. His investigations in a lifetime were meager; they consisted of a minor study of the nature of the gastric juice of the dog and studies of inflammation, the sterilization of catheters, the effects of missiles, and the effects of blood-letting. He made no attempt to use or fit the surgical laboratory as a center for purely

scientific investigations; for him it was only a clinical adjunct. Of his voluminous clinical writings many were published in various surgical systems and cyclopedias, but added little to the fund of modern medical knowledge. His two books, *The Essentials of Anatomy* (1887) and *Lectures on the Principles of Surgery* (1889 and 1905), enjoyed only local usage. He was, however, a master at organization. When he accepted the chair of surgery at the University, the Hospital facilities were of the meanest sort, as viewed by modern eyes. Only makeshift frame barracks, without an operating room, instruments, or nurses, were available. Plans for a new hospital had been made, however, and late in 1891 the building later known as West Hospital was completed. This building was well planned and well appointed for the time. The nursing school was organized in 1892. With these improvements, De Nancrede set up an efficient department, which, besides affording much better care to patients, provided more adequate training of students.

His career paralleled that of Dr. Alpheus Crosby in that they held the chairs of surgery at Dartmouth and at the University of Michigan simultaneously, the necessary lectures in New Hampshire being given during the summer months, when the Medical Department of the University of Michigan was not in session. De Nancrede held the professorship of surgery at Dartmouth from 1900 until 1913, when he was appointed to an emeritus professorship in that institution.

In 1904 De Nancrede's title was lengthened to indicate his directorship of the surgical clinic. His teaching career at the University of Michigan ended with his appointment as Emeritus Professor of Surgery in 1917. The scholastic honors conferred upon him by the schools in which he taught gave proof of the excel-

lent quality of his work. He was active in both local and national medical societies and served as president of the American Surgical Association in 1908. During the war with Spain he saw duty in Cuba as a chief surgeon, United States Army major, 1898, and was later recommended for the rank of brevet lieutenant colonel.

Records of De Nancrede's family life are sketchy. He married Alice Howard Dunnington, of Baltimore, in 1872, and nine children were born, of whom five survived. His outside interests included music, sketching, and athletics. It is said that the women of De Nancrede's family did more to popularize athletics at the University than did all of the student body and the faculty. As the first faculty women regularly to attend athletic events they made themselves interesting subjects for gossip. In time, however, attendance at student contests lost its social stigma.

One of his greatest disappointments came in 1917, when he hoped to have an active role in the United States Army during World War I; this was not to be. He was nevertheless appointed major in the Reserve Officers Training Corps in April, 1917, which somewhat softened the blow to his pride. His last years were relatively inactive. He died in Detroit in 1921, leaving, as do most physicians, little tangible evidence of the great service he had rendered to humanity.

Because of the chaotic events coincident with our participation in World War I, no outstanding figure could be found immediately to fill the vacancy made by De Nancrede's retirement. Cyrenus Garritt Darling ('81m), then Professor of Clinical Oral Surgery in the College of Dental Surgery and Professor of Surgery in the Medical School, was put in charge of the department, but, according to unwritten report, the appointment, when made, was understood

to be effective only until an individual of national reputation could be found.

Dr. Darling was born in Bethel, New York, in 1856. He attended the public schools of Bethel and an academy at Monticello, New York. After several years of private practice he returned to the Medical Department and served as an assistant to the chair of surgery from 1889 until 1892, when he was appointed Demonstrator of Surgery. Though he re-entered private practice in the early nineties and also was engaged in community affairs, serving as mayor in 1895, he continued to teach in the University for many years, not only in the Medical Department, but also in the Dental College. His membership in the dental faculty, begun with his appointment as Lecturer of Oral Pathology and Oral Surgery in 1892, continued until his retirement in 1926. He was promoted to the professorship of clinical oral surgery in the College of Dental Surgery in 1905, and from 1903 to 1907 was Acting Dean. In the Medical Department he was Lecturer on Minor Surgery from 1896 to 1906 and Lecturer on Genitourinary Surgery from 1899 until, in 1906, this subject was assigned to Dr. Ira Dean Loree ('oim), who for the past three years had been an assistant in the department. Darling was Clinical Professor of Surgery from 1905 to 1914 and dropped the last of his previous minor positions in the department in 1907 (*Medical School Announcement*, 1906-8). His success in surgical correction of cleft-palate and hare-lip cases was commended in the *Report of the University Hospital* for 1908, in which the Hospital superintendent drew attention to the University's facilities for teaching the combined skills of dentistry and surgery for relieving complicated fractures of the jaw and facial bones as well as oral deformities.

Darling was selected to serve as tem-

porary head of the Department of Surgery in 1912, during De Nancrede's absence on leave. In 1914 he was made full Professor of Surgery in the Medical Department and at about the same time became Professor of Oral Surgery in the College of Dental Surgery.

All of Darling's professional life was spent in Ann Arbor. He contributed little to medical literature; his main concern was his own practice. As a surgeon he was competent but not brilliant, and his diagnostic abilities, though outstanding, left very little impression on his contemporaries. He had no great interest in teaching, although his sincerity and operative skill impressed his students over many years. He was idolized by his few personal assistants, but his strong individualistic ideas kept him from contact with world progress in surgery and made him a strong local rather than a national figure. He was the product of his time—a great individualist with the provincialism of the clinical groups, then overshadowed by the preclinical departments, and constantly on the defensive but lacking the material or the support with which to fight. He had the respect of all and, in the light of his times, accomplished much as a person, for which he received much local acclaim. His personality was rather strong. Occasionally, patients whom he treated return to the clinic, and their first inquiry is frequently concerning Dr. Darling.

During his administration no changes were made in the organization or teaching practices of the department. He resigned from the medical faculty at the time of the appointment of his successor in 1919. A member and past president of the Michigan State Medical Association and a member of the Washtenaw County Medical Society and of the Ann Arbor Medical Club, he was preoccupied with surgery alone; as far as is known, except for temporary participation in local poli-

tics, he had few outside pursuits. He died at Ann Arbor, April 21, 1933.

Darling was succeeded by Hugh Cabot (Harvard '94, M.D. *ibid.* '98, LL.D. Queen's University [Belfast] '25), a man in part responsible for the present notable reputation held by the Department of Surgery. Born in 1872 at Beverly Farms, Massachusetts, to James Elliot and Elizabeth (Dwight) Cabot, Hugh Cabot enjoyed the benefits of an environment which was conducive to the full development of the individual's innate capabilities. In 1900, two years after his graduation from the Harvard Medical School, he was appointed surgeon at the Baptist Hospital in Boston, a position which he held for nineteen years. He became an assistant surgeon at the Massachusetts General Hospital in 1902 and shortly thereafter, surgeon, and served in that capacity until 1919. He also served at Harvard, first as an assistant professor of surgery for eight years and later, in 1919, as a clinical professor of surgery; between 1916 and 1919 he held a commission of honorary lieutenant colonel in the Royal Army Medical Corps.

He came to the University of Michigan with a greater previous experience than that of any of his predecessors, and his philosophy concerning educational methods embodied many advanced ideas only now being generally applied. He was a good surgeon, but lacked interest in technique. In his specialty, urology, he was widely known and respected. Because of his great analytic ability, his associates considered him an unusually skilled diagnostician. His relation to the Hospital patients was not intimate, yet those who knew him never forgot him. He believed in calling a spade a spade, and his candor and sincerity, often expressed in homely simile, set a precedent which still influences the relations of staff and patients. He greatly admired

directness and efficiency, and his aggressiveness and seeming lack of tact made many enemies of erstwhile admirers. His lectures to the students were excellent. His use of double negatives and of simple, earthy figures of speech and allegories served admirably to emphasize certain points and made his discourses vivid and interesting.

His greatest attribute, a keen judgment of men, is probably responsible for the imprint he left on the Medical School. Shortly after his arrival he surrounded himself with unknown young men who, he felt, had great capabilities, and these men and their assistants have given the present Department of Surgery an enviable national and international reputation. Furthermore, they are at present in the most productive phase of their careers, and their active influence will probably be felt for years to come. During the period of his service to the University, the new Hospital was constructed and occupied. One of the tasks which he admirably performed was the reorganization of the Department of Surgery. He believed that the organization should serve three purposes—the care of the ill, the teaching of students and interns, and original investigation. As he considered the first two of greater importance, the third was in great part neglected, and although a fairly large number of clinical observations by staff members were published during his administration, these contained no fundamental contributions to medical science.

His ideas concerning the requirements for entrance to a medical school differed somewhat from those prevailing at the University, and when he was appointed Dean of the Medical School in 1921 he strove to have his ideas adopted. They were tried, but later were thought to be inferior to the system previously used. At present it seems that, could a compromise have been possible, the more de-

sirable features of his plan of requirements might have been retained.

It was Cabot's opinion that the part-time medical professor was often forced to slight his teaching assignments because of the press of private practice, and he considered it imperative for the good of the students and of the Hospital that the chairs be held by full-time professors. The inability of the commonwealth to provide adequate salaries to compensate for the loss of income from private practice made it impossible to keep men of the desired caliber on the full-time basis, however, and this program was therefore discarded, even though everyone now considers the fundamental principle sound.

In 1930, after eleven years of active service to the University, Cabot resigned. Shortly thereafter he was appointed surgeon at the Mayo clinic and professor of surgery in the Graduate School of the University of Minnesota.

Frederick Amasa Coller (B.S. and Ph.G. South Dakota State College '06, M.S. *ibid.* '08, M.D. Harvard '12) left private practice in Los Angeles to come to the University of Michigan in 1920 as Assistant Professor of Surgery while Cabot held the chair. Coller was born in Brookings, South Dakota, in 1887. He attended the public schools of Brookings and the South Dakota State College, where, in addition to completing the regular collegiate science course, he did advanced work in biochemistry. He was an intern at the Massachusetts General Hospital from 1912 to 1914 and resident surgeon during the year 1914-15. After completing his formal training, he entered the Harvard unit of the American Ambulance Corps and saw service overseas with the Royal Army Medical Corps of the British Expeditionary Force in 1915 and 1916. With the entry of the United States into the war he was commissioned a captain in the Medical

Corps of the United States Army and in 1917 was promoted to major, a commission which he held on discharge.

Having come to the University as an Assistant Professor, he was successively advanced; he became Professor of Surgery in 1926 and after Cabot's resignation was asked to assume his present position as Chairman of the Department of Surgery.

DEVELOPMENT OF SPECIALIZATION.—

By 1900 the techniques of modern surgery were formulated, and with ever-increasing speed the new science was applied to the old art. The scope of surgery became too inclusive for any one individual to comprehend, and through the limitation of endeavor, specialization developed. De Nancrede had a catholicity of interest; he carried out operations on the eye, on abdominal organs, and on bones and joints—in fact, on every part and system of the body. Ophthalmology and otolaryngology were the first subdivisions of surgery in which special courses were developed, and even before Maclean's administration these were entrusted to a separate department, which was divided in 1904. Genitourinary surgery next received special consideration within the department, first under the charge of Dr. Darling from 1899 to 1906 and then under the charge of Dr. Loree. De Nancrede and Darling were interested in the acute and chronic lesions of bones and joints, and eventually most of the work now classified as orthopedics was given to the supervision of Charles Lee Washburne ('08*m*), under whose charge an active organization devoted to this specialty was developed within the department. The fields of specialization have never been sharply circumscribed, but have been developed in accordance with the bent and energy of individuals. Darling, closely affiliated as he was with the school known until 1927 as the College of Dental Surgery, stimulated and

gave opportunity to Chalmers John Lyons ('98d, D.D.Sc. '11) in the field of oral and faciomaxillary surgery, and the teaching of these subjects has remained a part of the work of the professor of oral surgery in the School of Dentistry.

Neurological surgery was conducted by the general surgeons until 1916, when it was assigned to Max Minor Peet ('08, A.M. '10, '10m, M.Ed. hon. Michigan State Normal College '34). Dr. Peet had interned in the Rhode Island General Hospital and had later served in the University of Pennsylvania Hospital as an assistant to Dr. Charles Frazer, one of the pioneer neurological surgeons of this country. He spent three years there in study and investigation and then returned to his alma mater to become a member of the staff. As the opportunities for work in his special field increased, he limited himself to it more and more, until, in 1925, the section of neurological surgery was formed; thereafter he devoted his entire attention to this specialty.

In 1930 Edgar Adolph Kahn (B.S. Med. '24, '24m) joined him in this work, and under the stimulus of their accomplishments the types of disease treated and the number of patients have steadily increased until the University section of neurological surgery is one of the most active of such units in the country. From Dr. Peet* and Dr. Kahn and their associates have come many original contributions, the most notable of which have been studies on hypertension, on surgical methods for the abolition of pain, and on the treatment of brain abscess and of subdural hematoma.

Dr. Cabot was primarily interested in genitourinary surgery, being an outstanding authority in that field as well as in general surgery and medical education. He continued and developed this specialty during his years with the Medi-

cal School, and the achievements of the section of the Department of Surgery devoted to it received national recognition. Reed Miller Nesbit (Stanford '21, M.D. *ibid.* '24) came to the department as an assistant resident in 1925. After training for five years in general surgery he became associated with Cabot, and upon Cabot's departure in 1930 he assumed charge of this subdepartment. Through Nesbit's energy, skill in organization, and abiding interest, the section in genitourinary surgery has grown in importance and usefulness. Among the outstanding contributions to the knowledge of urology made by him and his associates are significant studies concerning the surgical treatment of prostatic disease, anesthesia in this branch of surgery, cystometry, the relation of urology to endocrinology, and problems of renal and bladder functions. Nesbit's insistence upon long, fundamental training of his students and associates before their entering on specialization has been influential in the firm establishment of this branch of surgery.

As mentioned, an organization for instruction in bone and joint surgery was built up within the department by Dr. Washburne. He began this work in 1911, when orthopedics was introduced into the course on special surgery. He resigned in 1920 to take up private practice, and LeRoy Charles Abbott (M.D. California '14), an appointee of Cabot's, undertook the supervision of the section in orthopedic surgery. Dr. Abbott had served as intern in the University of California Hospital and later had taken special training in orthopedic surgery at the Massachusetts General Hospital. Upon the entrance of the United States into the war he became a consultant in orthopedic surgery. He served actively with the American Expeditionary Forces in France and England and after the termination of hostilities spent a year of

* Died March 25, 1949.

further study with Sir Harold Stiles in the University of Edinburgh. Under his energetic leadership the scope and size of the bone and joint section and its importance as a teaching unit rapidly increased. Student interest was aroused, and many young men who, stimulated by the accomplishments of Abbott and his predecessors, entered this field of surgery have made important additions to the knowledge concerning it. When the Shrine hospitals for crippled children were developed, in 1923, Abbott accepted the post of chief surgeon to the Mother Shrine Hospital in St. Louis. He was succeeded at the University by Carl Egbert Badgley ('17, '19m), whose professional skill and alert and progressive attitude brought about not only the continued growth of the orthopedic section, but also a marked increase in its importance as a successful clinic and educational center. In the late twenties the state-wide interest in the problem of the crippled child threw a great responsibility on the orthopedic section, which has now become one of the largest and most important units of its kind in the United States. Badgley resigned in 1929 to take charge of orthopedics in the Henry Ford Hospital in Detroit, and for the next three years the subdepartment was under the charge of Vernon Lewis Hart ('24m), associated with Mr. Norman Leslie Capener (F.R.C.S. '22), who was graduated from Saint Bartholomew's in London and was trained in surgery at Michigan also. Badgley returned to reassume charge of the bone and joint section in 1932, and, by enthusiasm and skill, he has developed the staff in this specialty into a mature group with fine traditions and of the widest usefulness.

The subdivision most recently formed within the department is the section of thoracic surgery, the newest surgical specialty. Over a long period, such operations on the chest as the drainage of empyema and the drainage of lung ab-

cess had occasionally been performed in the University Hospital. Conrad Georg ('96, '99m), when a teaching member of the department, had carried on experimental investigations on problems of thoracic surgery, but after he left the University for private practice no more studies of this character were made.

John Alexander (Pennsylvania '12, A.M. *ibid.* '13, M.D. *ibid.* '16, Sc.D. hon. *ibid.* '40) came to the department in 1920, at the invitation of Dr. Cabot, with the assignment to develop a clinic in thoracic surgery. During the four years since his graduation from the University of Pennsylvania Medical School he had been a member of the surgical and teaching staff of that school. For some years the clinical material was scanty, and Alexander had an opportunity to investigate, study, and clarify the problems of thoracic surgery. The publication of his book, *The Surgery of Pulmonary Tuberculosis*, in 1925 greatly stimulated interest in the subject in this country and abroad. In January, 1927, the first thoracoplasty for tuberculosis in the state was performed in the University Hospital. The number of patients referred to the Hospital for treatment of surgical diseases of the chest steadily increased, and therefore, in 1928, Alexander limited his work entirely to thoracic surgery. He was probably the first surgeon to confine his efforts to this field. The clinic developed to such an extent that in 1931 it was found advisable to augment the staff, and Cameron Haight (California '23, M.D. Harvard '26) joined the faculty to work with this section. Haight had served an internship in the Peter Bent Brigham Hospital in Boston and also, for three years, had been on the staff of the surgical department of Yale Medical School.

In 1927 an arrangement between the University and the Michigan State Sanatorium at Howell was effected, through

which the thoracic surgery staff members became consultants to the Sanatorium, and two floors added to the Hospital in 1930 and 1931 for the care of patients with pulmonary tuberculosis provided excellent clinical facilities. The influence of Alexander and his associates on the development of this specialty has been extremely important in surgical circles throughout the world. These men have been pioneers in all phases of thoracic surgery, Haight having performed the first pneumonectomy in the Western Hemisphere and the second in the world, and many of their graduate students are now leaders in this subject in various parts of the country.

With the development of special fields in surgery, justifiable because of the opportunity thus afforded to advance knowledge by intensive study of limited objectives, the activities of the so-called general surgeon also became circumscribed. The field remained a large one, nevertheless, and with the increase in the amount of clinical material it became necessary to divide this service into two sections. In 1930 Henry King Ransom ('20, '23*m*, M.S. '34) and Eugene Breckenridge Potter ('25*m*) were given charge of these, the "red" and the "blue" services.

After his graduation in 1923, Ransom's professional training at Michigan was continued by an internship and an assistant residency in the department. He held a National Research Council fellowship for a year and then took graduate work in Johns Hopkins University. Returning to the department, he advanced through the residency and an instructorship and was made Associate Professor of Surgery in 1933.

Dr. Potter also continued in the department after his graduation, eventually becoming Associate Professor of Surgery. In 1936 he left to become chief surgeon to the Virginia Mason Hospital and Clinic in Seattle, Washington, an

important and enviable post. His place was taken by Walter Grierson Maddock ('24, 27*m*, M.S. '34), who in 1940, at the close of the period here recorded, was Associate Professor of Surgery. As undergraduate instruction in surgery should be largely confined to the fundamentals of the subject, which are still in the province of the general surgeon, the teaching load of this part of the department is by long odds the heaviest one. To many men who have held the positions of resident and instructor, the department is indebted for sustaining and carrying on undergraduate instruction.

Before 1920 the arts of surgery dominated surgical practice. Anatomy and pathology were traditionally the professional equipment of the surgeon. In recent decades it has been increasingly recognized that physiology, chemistry, and bacteriology are likewise of fundamental importance and that surgery can advance only if this concept is kept in mind.

From 1920 to 1930 the department grew at such a pace, with increasing clinical loads and with the development of true specialization and of new teaching methods, that investigation of surgical problems was carried on only in a fragmentary way. Since then, as the organization has become stabilized, it has been possible to maintain a program of more thorough research in the basic problems of surgery. Encouragement and financial aid from the Rackham Foundation have helped maintain laboratories for many important and practical studies, principally in the field of abnormal metabolic conditions of patients with diseases seen in the surgical wards. These studies are carried on by young surgeons, in succession, as part of their graduate training, but are supervised by the members of the permanent staff. The departmental publications have numbered about seventy a year since the introduction of this policy.

GRADUATE TRAINING.—Opportunities

for advanced training in surgery and its specialties were available in the department throughout the administration of De Nancrede, and many of the advanced students of the department in his time are now outstanding in the profession. Under the stress of advancing medical opinion, both local and national, Cabot was enabled to mold the system of graduate training into modern form. The national boards of all surgical specialties set standards, and at an early date the departments of Otolaryngology, Ophthalmology, and Obstetrics and Gynecology met these demands by offering residencies leading to five years of sound training in these specialties. The Department of Surgery, by 1930, had likewise adopted a pyramidal system of graduate training in general surgery and in each surgical specialty leading to certification by a national board. Certain difficulties with relation to advanced training in the fundamental medical sciences demanded

by these boards but only partly available with the present facilities have been encountered, and not all these difficulties have been overcome. In spite of this situation the graduate training now offered in surgery at the University is on a high plane when compared with that given at other similar training centers throughout the country, and the surgical staff is proud of the many men carrying on the highest type of training and practice in every part of the nation who have been trained in our graduate school of surgery. The department has been in the forefront in developing and formulating this new and important part of medical education.

The staff may now justifiably consider the development of the department in clinical surgery, in undergraduate teaching, in research, and in graduate teaching worthy of the high standards of the University of Michigan.

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The University Hospital



University of Michigan Hospital
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— Engraved by J. L. —

THE UNIVERSITY OF MICHIGAN HOSPITAL

THE UNIVERSITY HOSPITAL

IN 1869, almost two decades after the establishment of the Department of Medicine and Surgery in the University, the first little hospital on the campus was authorized. The idea of utilizing hospitals as centers of clinical training had developed slowly in this country, although bedside hospital teaching was highly advanced in Europe, especially in Germany and in France.

A few medical schools, notably Yale, Harvard, and Virginia, arranged to have their students use the local hospitals for clinical study, but a report by Professor Cabell, of the University of Virginia, reprinted in the *Peninsular Journal of Medicine*, maintained that "the plan of making clinical instruction follow, instead of accompany, elementary teaching is so obviously the natural and effective plan, that all our better students adopt it in spite of the absurd attempts of the schools to impose upon them a different system" (*R.P.*, 1837-64, p. 776).

The number of adequately equipped hospitals was small, and the difficulties of maintaining them in connection with medical schools seemed at that time insuperable. The schools themselves, for the most part small proprietary institutions scattered over the country, were very weak and depended almost entirely upon student fees for their support. Instruction was, therefore, almost entirely by lectures.

In the early years of the University of Michigan Medical School, then called the Department of Medicine and Surgery, the few patients who came for treatment to members of the medical faculty gave some semblance of the clinical instruction advertised in the *Announcement*. The main emphasis, how-

ever, was on didactic instruction; clinical instruction was in practice a negligible part of the program. The prevailing lecture system was considered the only acceptable method as far as work in the University was concerned. Although the desirability of actual bedside experience for the young physician was recognized, it was difficult to obtain such instruction except under the supervision of a preceptor—an established practitioner with whom the young doctor served an apprenticeship as assistant.

The Regents, not unmindful of the increasing public demand for a hospital, in March, 1861, asked the medical faculty to submit a plan for the conversion of one of the faculty residences on the campus into a hospital. The faculty, however, took no action, and the committee was discharged the following June. During the Civil War, because of the large number of wounded treated in Army hospitals, the public became more aware of the need for hospitals. The Regents in 1864 considered the establishment of a military hospital in Ann Arbor, but no action was taken in the matter, probably because the end of the war was in sight.

After 1865 a great increase in medical school enrollment in this country resulted in further agitation both for bedside hospital instruction and for expert care. In 1868 the medical faculty reported that even though there were no hospital facilities available, over three hundred patients, more than six times the number cared for in any previous year, had come to the University for consultation and help.

In 1868 Dr. A. B. Palmer, Professor of the Theory and Practice of Internal Medicine, headed a movement in the

American Medical Association to obtain more clinical instruction in American medical schools. As a result of his efforts, as well as of the increasing community demand in Ann Arbor for a hospital, the faculty finally asked to be allowed to establish a hospital. The Regents authorized, in 1869, the use of the northeast professorial residence on the campus for that purpose, at a total expense of \$582.18 for necessary changes. This building, which afforded room for about twenty beds, was a small two-story, stucco structure, with two rooms on each floor opening from either side of a central hall.

In the words of Dr. Victor C. Vaughan, this little hospital was "nothing more than a receiving home, in which patients brought in for the clinics could be kept before and after presentation to the class. There were no wards and no operating or dressing rooms, no place where students might receive bedside instruction" (Vaughan, *A Doctor's Memories*, pp. 197-98). While such a makeshift was not well adapted for hospital purposes, it was a significant beginning because it represented a most important landmark in the history of American medicine—the first instance of a university owning and controlling a hospital in connection with its own medical school. The University Hospital has remained entirely under the control of the Regents and of the Medical School and has provided teaching facilities under the most favorable conditions.

Before the opening of the University in the fall of 1869, Dr. Abram Sager, Dean of the Medical School, submitted a plan for the management of the new Hospital which indicated that the faculty proposed to utilize all of the patients who applied, rich and poor alike, as material for clinical study. This rule was changed later at the insistence of the medical profession of the state, so as to exclude as far as possible those able to

pay a minimum fee for professional services. Nevertheless, until about 1920, all who entered the Hospital did so with the understanding that they were to be used, if necessary, for teaching purposes. The charge for maintenance was to be placed at the lowest rate consistent with the avoidance of actual loss. This was the basis of a long-standing argument among the Regents, who insisted that the Hospital be self-supporting, and the clinical faculty, who maintained that low hospital charges were necessary to furnish the maximum amount of teaching material.

THE CAMPUS PAVILION HOSPITAL, 1876-91.—The original little campus residence Hospital, although inadequate, served its purpose by demonstrating that such an addition to the facilities of the school was both desirable and practicable. Efforts to secure a legislative appropriation for a larger hospital resulted in 1875 in a grant of \$8,000 for an enlarged University Hospital, contingent upon a contribution of \$4,000 from the city of Ann Arbor. Within a year the new Hospital was opened. It provided sixty beds and was widely heralded, although actually rather a sorry affair, judged by modern standards, consisting of two frame pavilions 114 feet long and 30 feet wide, which extended from the rear of the original little Hospital. Without a basement, poorly ventilated, originally without an operating room, it was typical of the era and was, in fact, designed to last only five years.

At first the Hospital had been kept open only six months of the year, but eventually special support from the legislature, first granted in 1877, permitted full-time operation. It was, however, closed for many summer periods during the succeeding two decades. In 1897 summer operation was made the condition of continuing legislative support for the Hospital.

The Regents directed in 1878 that one-fifth of the beds available be assigned to patients of the newly created Homeopathic faculty. This resulted in an increase in the total number of beds to about seventy. In 1879 an appropriation was made for converting another residence on the north side of the campus into a Homeopathic hospital. The University Hospital thus recovered all the ward space in the original pavilion building. At this time funds were granted for further expansion and for the building of an operating amphitheater and of a dining room and kitchen in connection with the matron's home. In 1881 an eye and ear ward was added—the first special ward to be erected as a separate building. The "older [or residence] portion of the Hospital [was] occupied by the Resident Physician, Matrons, and private rooms for very sick patients" (*R.P.*, 1881-86, pp. 223-24).

This enlarged Hospital remained the center of clinical instruction of the Department of Medicine and Surgery until 1891, a period of fifteen years. It provided for the clinics which were gradually developing—in medicine under Dr. A. B. Palmer, in surgery under Dr. Donald Maclean, in obstetrics under Dr. Edward S. Dunster, and in the new field of eye and ear service under Dr. George E. Frothingham. After 1891 this old campus building was utilized for many years by the College of Dental Surgery before it was torn down to make room for the present Chemistry Building.

THE CATHERINE STREET HOSPITAL, 1891-1925.—Throughout almost the entire life of the campus Pavilion Hospital, agitation continued for better hospital facilities. It was not until 1889, however, when the city of Ann Arbor once more came forward with a contribution of \$25,000 to augment an appropriation of \$50,000 by the legislature, that the construction of an entirely new hospital on

Catherine Street was made possible. This building, completed in 1891, although a great improvement over the old Hospital, was designed before hospital architecture had become a specialty, and there were many architectural faults, corrected to a certain extent as additional buildings were added.

Eventually, the old Hospital group, as it is still called, comprised a congeries of some twenty buildings, large and small. Originally, two main structures were erected on the site, one on the east for the Medical Department and one on the west for the more recently established and smaller Homeopathic Medical College, which demanded facilities equal to those of the Department of Medicine and Surgery. The small heating plant built between these two buildings proved inadequate to the growing needs of the Hospital, and a larger heating plant (the present Wood Utilization Laboratory) was erected at the rear of the group in 1897. The new heating plant permitted the alteration and extension of the old building which was remodeled and used continuously as a home for nurses from 1898 until Couzens Hall was opened in 1925.

When the new Homeopathic Hospital on North University Avenue was occupied in 1900, the west building of the Catherine Street group, which had been the Homeopathic Hospital, became the Medical Ward of the University Hospital, and the Department of Surgery took over practically the entire east building, which for the past nine years had been the University Hospital. The Surgical Ward, the Nurses' Residence, and the Medical Ward were then connected by corridors. The westernmost of these three buildings, the first Medical Ward, was destroyed by fire in 1927. Some of the congestion in the Hospital was relieved in 1896 by the erection of a small office building, the capacity of which was

more than doubled by an addition made in 1918.

In 1901 Mrs. Love Maria Palmer, widow of Dr. Alonzo B. Palmer, bequeathed \$20,000 to establish a special ward as a memorial to her husband, and an additional \$15,000 as an endowment for its support and for the maintenance of free beds. This building, which was opened in 1904 and formally dedicated in 1907, was placed directly in front of the nurses' home and made a part of that building. It was known as the Palmer Ward and was assigned to the surgical and medical care of children. Originally, it provided sixty-four beds. As few children were referred to the Hospital at first, much of the new wing was used to house nurses and to accommodate maternity cases. An X-ray laboratory was set up in the basement.

Upon the urgent representations of the heads of the clinics in ophthalmology and otolaryngology, a new building to serve as an eye and ear ward was recommended by the Hospital Committee in 1904. It was not until 1909, however, that \$25,000 was voted by the Regents for this purpose. In addition, equipment was later purchased for \$9,000. This ward was completed in 1910 and was connected with the main building by a covered passageway.

In the early days of the Hospital, the question of contagious diseases was always serious, and pressure from the community for a contagious disease hospital speedily developed. Nevertheless, this need was not met until 1897, when a small building north of the new Homeopathic Hospital, formerly a laundry, was converted into the University's first separate contagious disease hospital. This primitive structure could accommodate only the few patients who contracted contagious diseases while in the various hospital wards, and when an epidemic of smallpox developed in the

city of Ann Arbor in 1908 patients perforce were isolated in another hastily prepared building.

The situation did not improve until 1914, when, following an appropriation of \$25,000 for this purpose by the city, a contagious disease hospital was built northeast of the hospital group. Two houses which had been moved near the Hospital and designed originally for patients with contagious diseases were never used for that purpose, but were soon taken over as housing for maternity patients.

A separate building for each contagious disease was out of the question because the expense of separate units would have been about four times the amount voted by the city. A hospital in Providence, Rhode Island, had undertaken the treatment of a variety of contagious diseases under one roof, however, and such a hospital, 40 by 100 feet, was designed by J. H. Marks, then Superintendent of the University Buildings and Grounds Department. A nurse was sent to Providence to learn the technique of directing such a hospital, and the system was inaugurated and carried out by Dr. D. M. Cowie. Under his skillful administration there were few cross-infections.

A very substantial increase in the actual facilities of the Hospital came through the authorization of a Psychopathic Hospital by the state in 1901. It was completed in February, 1906. This building, maintained by the state and not by the University, was erected east of the Hospital group of buildings and accommodated forty patients. It was described as follows:

The Legislature of Michigan at its last session . . . made provision for an addition to the University Hospital of a ward especially equipped for the care of a limited number of acute cases of insanity. This was done with the view of furnishing an oppor-

tunity for the more thorough study of the conditions attending insanity in its incipient stages, and with the hope that, by the aid of specialists in all branches of medicine and surgery, and the laboratory facilities available at the University Hospital, there might result the discovery of causes of these diseases at present unknown, and the development of methods of treatment that might increase the number of cures. The advantages to the medical student of such an addition to our hospital are apparent to all. (*Announcement of the Department of Medicine and Surgery*, 1902-3, p. 51.)

With a laboratory and an addition for violent patients, this was the State Psychopathic Hospital until the legislature in 1937 turned it over to the University.

Facilities for the clinic in obstetrics and diseases of women and children were at first practically nonexistent, but by the time the first campus Hospital was built, an increasing number of cases was reported every year. In 1903 provision had been made for temporary housing of maternity cases in Palmer Ward, but this was a makeshift arrangement, and in 1906 a building originally moved from North University Avenue was utilized by the Department of Obstetrics. A second building was moved to an adjacent site in 1908. These two frame houses were in use until the old Eye and Ear ward of 1910 was rearranged for the care of obstetrical patients in 1925.

A small frame dermatology ward, providing space for twenty-five beds, erected in 1918 at the rear of Palmer Ward, was the last addition to the old Hospital group. Of temporary construction, it was torn down in 1932.

Despite its many drawbacks, scattered buildings, long passageways, crowded wards, and unsanitary corners, the old Catherine Street Hospital group, during a period of nearly thirty-five years, had become one of the great teaching hospitals of the country. As in the case of the earlier hospitals, however, the obvious

deficiencies of the Hospital and the ever-increasing demands upon it, once more led to agitation for new and better facilities.

THE PRESENT UNIVERSITY HOSPITAL.—In 1915 the Regents appropriated the sum of \$1,500 to cover the expense of plans for a new hospital. The legislature, in December, 1916, was asked for an appropriation of \$1,050,000, to be distributed in equal payments over a period of six years, for construction of the hospital. The request was granted in the spring of 1917. Albert Kahn, of Detroit, was designated as the architect for the building.

In the meantime Dr. Peterson, then engaged in war duties, resigned as Medical Director, so that a medical superintendent and director could be secured who would give his whole time to the Hospital and superintend the plans and specifications for the new building. Dr. Christopher G. Parnall ('02, '04M) was appointed Medical Superintendent in April, 1918, and with his coming the whole scheme of management of the Hospital was changed. At that time yearly admissions numbered approximately nine thousand patients.

Early in 1919 the University acquired a site for the Hospital on Ann Street, a block south and east of the old Hospital on the hills overlooking the Huron Valley, and early in 1920 the construction of the new building was under way. The original plan to erect the building by units as the successive appropriations of \$350,000 for each biennium were made available was found impracticable, and it was constructed as one unit, designed for six hundred beds. The shell of the Hospital was completed in 1921, but, unfortunately, no more funds were available, and for two years the building remained with the windows boarded up, until a further appropriation of \$2,300,000 in 1923 permitted its completion. When the Hospital was actually ready

and equipped in 1925, it represented an expenditure of \$4,440,000.

On August 12, 1925, 597 patients were moved from the old buildings on Catherine Street, and a new era began in the history of University Hospital. In his report for the year 1924-25, Harley Haynes ('02*m*), who in September, 1924, had succeeded Dr. Parnall as Director of the Hospital, stated that 23,010 patients had been registered in the Hospital, about half of them inpatients and half of them outpatients. Couzens Hall, the nurses' residence, was also completed in 1925.

The opening of the present Hospital inaugurated an expanding program. The clinics in the old Hospital were all given new quarters carefully designed for their special requirements, and new clinics were gradually organized.

When the older Hospital was built in 1891, it was one of the few large hospitals of the country and one of the very few maintained under university auspices, but hospital design and methods of hospital administration had made such great advances that it had become very unsatisfactory. The new University Hospital was at once recognized as one of the most up-to-date institutions in the country, skillfully designed both for the care of the sick and for medical instruction. Its facilities were utilized almost from the first days of occupancy, and usually there has been a waiting list of patients.

The building is 460 feet long and is constructed of light sand-colored brick with stone trimmings. It has branching wings at either end, which give it the general form of a double Y ($>—<$) connected at the stems. Its thirteen stories are carried on regularly spaced piers which form the units for the separation of wards, classrooms, laboratories, and offices. The main structure comprises nine stories with an additional sub-basement devoted to shops and stor-

age, two floors over the central section forming a one-hundred-bed tuberculosis unit, with a smaller unit on the roof forming a thirteenth story, designed as a recreation center and school for crippled children.

A three-story administration wing rises directly before the main building. At the rear are a large ten-story surgical wing, a five-story Neuropsychiatric Institute, and an interns' home, built since the original construction of the Hospital. All are connected with the main building by a long corridor so that they form, in effect, integral parts of the Hospital. The two additional floors devoted to the care and treatment of tuberculosis were added in 1931, the Neuropsychiatric Institute in 1937, and the interns' home in 1939. Other minor additions have been a small animal house built in 1925, a root-cellar addition in 1927, and a building for storage of inflammable X-ray film in 1929. Additional storage space, a machine room, and a penthouse for the elevator machinery were added in 1939.

The building stands at the crest of the line of hills which define the Huron Valley, so that the rear is actually several stories higher above the ground than is the front of the building, thus giving added light and ventilation to the lower floors. The first floor of the main building and the ground floor and the first floor of the surgical wing constitute a diagnostic clinic in which every department of the Hospital is represented. Here all patients are examined and referred to the proper department for treatment. The main entrance to the Hospital is through the administration section, to the second floor, on which are the general offices and nurses' headquarters. On the floor below are the general administration, finance, and social service offices. There is space in the basement for the storage of records.

The Hospital has 823 beds, some of

which are in private rooms. The ten acres of floor space include wards, laboratories, operating and diagnostic rooms, and offices. With land and equipment the Hospital cost about \$5,350,000. The value of the old hospital group on Catherine Street is given in the University inventory at about \$400,000. These old buildings have since been used as convalescent wards and special research laboratories.

The number of patients admitted to the Hospital clinics in 1938-39 was approximately 24,000. An additional 30,000 were treated in the outpatient department. This number dropped sharply in 1939-40 because of a change in the state law which effected a reduction in the amount paid for the care of patients referred by the counties and state, so that more patients were sent to local hospitals and infirmaries. In that year admissions dropped to 16,500, with nearly 27,000 outpatients.

CLINICAL SERVICES.—From the opening of the Department of Medicine and Surgery in 1850, persons suffering from various ailments either applied for diagnosis and treatment or were brought to Ann Arbor by their doctors. These patients, at first not more than fifty or sixty a year, consulted the medical faculty on Saturday mornings, when they were demonstrated "before the class." As previously mentioned, this was a negligible part of the instruction.

There was no hospital, however, for nearly twenty years, and such operations as were necessary were performed in the anatomical lecture room, and patients were cared for by relatives, medical students, or untrained nurses. Since this was before the days of antiseptics, there seemed no incongruity in operating in an anatomical lecture room. Even when the first little Hospital on the campus was enlarged and became the Pavilion Hospital in 1876, no operating room was in-

cluded, and the old arrangements prevailed until the Homeopathic Medical College, in 1879, equipped its new hospital with an operating amphitheater, whereupon the "regulars" were given a similar addition to their hospital.

For a few years after the Department of Medicine and Surgery was established in 1850, it was stated in the medical *Announcement*: "Clinical instruction, it is believed, is far better imparted in . . . private practice . . . The hasty walk through the wards of a hospital . . . furnishes but a sorry substitute for the close and accurate study of cases . . ." The statement was dropped in 1857, which can be taken as indirect evidence of a growing realization of the importance of clinical instruction. Another evidence is the establishment of a summer clinical course in Detroit in 1857 by Dr. Zina Pitcher. This was discontinued after two years, despite the appeal of forty students for a continuation of the course in Detroit.

General recognition of the necessity for clinical instruction was growing, although the faculty for the most part clung to the old didactic methods of teaching. The American Medical Association held a convention in 1867 to consider suggested reforms in medical education. Dr. Alonzo Palmer was a delegate to it. A graded medical course of three years was recommended, each year to have a minimum duration of six months, and the third year to be devoted to clinical instruction in a hospital. These recommendations were laid before the Regents.

In 1868 Palmer, as chairman of the Committee on Medical Education, in a report to the American Medical Association, stated:

[The importance of clinical instruction can] scarcely be exaggerated [but] clinical medicine cannot be properly pursued while the student is listening to from five to seven

didactic lectures a day If the present system of short courses of lectures be continued, the most imperative need is the establishment of distinct schools of clinical instruction where students shall be required to attend before presenting themselves for graduation. (*Trans. Amer. Med. Assn.*, 19 [1868]: 111.)

These progressive steps were not realized immediately. It was not until 1880 that the three-year course was required at Michigan, though the third year was suggested in 1875 and offered as an option in 1877. But in these measures can be seen the germ of the present medical curriculum in which the third and the fourth years are given increasingly to clinical instruction in the Hospital.

The question of financing a hospital was a major problem. After their unsuccessful attempt to have an Army hospital established in Ann Arbor, the Regents became interested in the possibility of a state hospital for indigent patients in connection with the University, but nothing came of these plans.

Though a few patients came to the University even before the first Hospital was opened, little in the way of clinics in the modern sense existed. The clinics originally associated with the Hospital were indicated by the titles of the first professorships, but it was probably not until 1880, when the amphitheater of the campus Hospital was completed and the additional title of clinical professor was given to the professors of internal medicine, surgery, obstetrics, and ophthalmology, that the first real steps toward systematic clinical instruction were taken. As new members of the faculty specializing in different fields were appointed other clinics came to be established.

INTERNAL MEDICINE AND PEDIATRICS.—By 1860, when Alonzo B. Palmer took charge of the didactic and clinical instruction in internal medicine, stu-

dents were given some opportunity to study cases, and up to the time of his death in 1887 many improvements were made in conditions affecting the efficiency of all the clinical departments. Several of these took place within the twelve years when he was Dean—the building of the amphitheater, the recognition and fostering of the departmental clinics, the passage of a law authorizing the treatment of dependent children in the University Hospital at state expense, and the extension of the medical course from two six-month terms to three full college years, partly with a view to providing throughout the senior year frequent bedside instruction accompanied by clinical lectures.

George Dock, who became head of the Department of Theory and Practice in 1891, built up a laboratory of clinical medicine for the dual purpose of carrying out instrumental investigations of disease and for teaching techniques of diagnosis, and his success in making laboratory work an important part of the study of clinical medicine led to the adoption of similar teaching devices in the other clinical departments.

The erection of Palmer Ward made possible the organization of a special children's clinic in 1906 within the Department of Internal Medicine. The work in both pediatrics and contagious diseases was separated from that in general medical practice by the formation of a new department under Cowie in 1921.

Dock was followed in 1908 by Albion W. Hewlett, who before his resignation in 1916, added new equipment, particularly for the study of the cardiovascular system. In 1916–17 the medical clinic was headed by Nellis D. Foster. He in turn was succeeded by Louis H. Newburgh, acting head of the Department of Internal Medicine. Imbued with the idea that investigation and research are essential to a growing clinic, Newburgh

carried on studies in diabetes which led the Rockefeller Foundation to give funds for a diet kitchen, a dining-room for diabetic patients, and a small laboratory. This simple clinic was the forerunner of the present diet therapy clinic. Studies in metabolism and heart diseases were inaugurated with the purchase of an electrocardiograph and the establishment of a heart station. Newburgh was succeeded in 1922 by Louis M. Warfield, who resigned, however, in 1925 to return to private practice.

With the opening of the Palmer Ward for children, the demands of pediatrics developed so rapidly that the number of patients grew from fewer than fifty in 1905 to more than 2,300 in 1920. This necessitated the removal of the maternity cases to two dwelling houses near the Hospital, which had been fitted up for that purpose, so that the first floor of Palmer Ward in 1911 was finally given over entirely to pediatrics. A new food laboratory, diet kitchen, and pediatrics laboratory in the basement were added. By 1913 the nurses on the two upper floors of Palmer Ward were also compelled to find quarters elsewhere, and the space thus gained, together with the passageways leading to the building on each side, was used for children. In 1907 an orthopedic ward had also been opened in the building.

Upon the completion of the new Hospital in 1925, the children's ward was removed to the sixth floor of the new building, where a tablet marked it as the Palmer Ward, in memory of Dr. Palmer and in recognition of Mrs. Palmer's generous gift a quarter of a century earlier.

The first professorship in obstetrics and gynecology included the diseases of children. A separate clinic in pediatrics was not established until some years after the completion of the Palmer Ward in 1905. Dr. D. M. Cowie became Clinical Professor of Pediatrics and Internal

Medicine in 1907 and continued in charge of this clinic until his death in 1940. Cowie was also in charge of the program in infectious diseases after the erection of the Contagious Disease Hospital, for which funds were given by the city of Ann Arbor in 1913. He was made Professor of Pediatrics and Infectious Diseases in 1921.

Children had been treated in the University Hospital before 1908, but it was not until Dr. Cowie's appointment that they were reported separately by the Department of Internal Medicine. The clinic grew with the large number of patients referred to it under the state laws, particularly those of 1927 authorizing care of crippled children in the state. When the laws were changed in 1939 under Act No. 283, and the appropriations for the care of children were reduced, the number of children referred to the University Hospital substantially decreased.

Dr. Cowie was succeeded by Dr. Charles Fremont McKhann as Professor of Pediatrics and Communicable Diseases and chairman of the department.

To expand further the service of the University Hospital for sick and crippled children, the Northern Michigan Children's Clinic at Marquette (a unit supported by the Children's Fund of Michigan), was designated by the Regents in 1931 as a part of the University Hospital, and the acceptance of children for state care by the clinic was authorized. A similar action for the Central Michigan Children's Clinic at Traverse City was taken in 1936. Each of these clinics in 1940 represented the expenditure of some \$5,000 annually.

The appointment of Dr. James D. Bruce as Director of Internal Medicine and Chief of the Medical Service almost exactly coincided with the opening of the new Hospital. He came shortly after the receipt of the endowment of the Thomas

Henry Simpson Memorial Institute for Medical Research, which enlarged the already extensive fields of research carried on in internal medicine. When the Regents approved the establishment of the Department of Postgraduate Medicine, Dr. Bruce was named its head, to begin the organization of the department during the year 1927-28. Dr. C. C. Sturgis, who in 1927 had been named Director of the Simpson Memorial Institute, in 1928 became Director of the Department of Internal Medicine.

The second floor of the Hospital is occupied for the most part by the internal medicine service. An important offshoot of this clinic, the Heart Station, was set up in a part of the basement of the surgical wing. This clinic was inaugurated in 1921 on Dr. Newburgh's initiative, and Dr. Frank N. Wilson, a recognized authority on diseases of circulation, was appointed Associate Professor of Internal Medicine and made responsible for further research and use of the electrocardiograph. In a comparatively short time the equipment was increased, and in the new Hospital the Heart Station has become an important aid to diagnosis.

The clinic for the study of tuberculosis was also first developed under the Department of Internal Medicine. Two floors were added to the Hospital in 1931 to care for this program.

SURGERY.—After the resignation of Moses Gunn, the first Professor of Surgery, in 1867 and a series of short incumbencies, Donald Maclean was obtained as Lecturer in Surgery in 1872 and in the following year was appointed Professor of Surgery. In 1880 as head of the "surgical clinique" (*R.P.*, 1876-80, pp. 531-37), he reported to the Regents that clinics were held daily, that almost every form of "surgical affection" was presented, and that treatment was "practically illustrated." Maclean was succeeded in 1889 by Charles De Nancrede,

whose skill as a surgeon gave the clinic an outstanding reputation for more than a quarter of a century. When the former University Hospital Building became the Surgical Ward in 1900, an amphitheater and three smaller operating rooms were made available. As early as 1897 emphasis had been placed upon improved methods of sterilization, and the use of X-ray apparatus, loaned to the University, proved invaluable in surgical diagnosis. Under De Nancrede, a surgical laboratory was established which increased facilities and stimulated original investigations.

Specialization within the Department of Surgery was placed upon a substantial foundation by the appointment of Ira D. Loree as Clinical Professor of Genitourinary Surgery in 1908 and by the establishment of a weekly clinic in that subject. Cyrenus G. Darling, previously Lecturer on Genitourinary and Minor Surgery, and at that time Clinical Professor of Surgery, and of Oral Surgery in the College of Dental Surgery, had charge of the cleft-lip and cleft-palate cases. A large number of cases of bone fracture in the surgical clinics led to the establishment of a clinic in orthopedics in 1911, with Charles L. Washburne as demonstrator, and a few years later Max Minor Peet took charge of a new clinic in neurological surgery.

Failing health led De Nancrede to turn more of his work over to Darling, who succeeded him and became head of the surgical clinic in 1917. Darling resigned in 1919 and was replaced by Hugh Cabot, who was shortly to become Dean of the Medical School and who remained in charge until 1930. Cabot's particular interest was genitourinary surgery, and upon Loree's resignation in 1920, he concentrated primarily in this field.

The surgical clinic, one of the oldest and most important teaching divisions

of the Hospital, had occupied a separate building in the days of the Catherine Street Hospital. In the new building it was assigned, with its subdivisions, to parts of the third, fourth, and fifth floors of the Hospital. Under Cabot, who was Professor of Surgery at the time the new Hospital was occupied, the question of full-time service for the members of the Hospital staff was under serious consideration, and for a time the different surgical clinics were maintained on a full-time basis. When Cabot resigned in 1930, Reed M. Nesbit was placed in charge of the clinic in genitourinary surgery.

In orthopedic surgery LeRoy C. Abbott succeeded Dr. Washburne in 1918 and he, in turn, was followed in 1924 by Carl E. Badgley, who inaugurated the clinic in the new University Hospital. He has remained in charge, except for the three years when he was at the Ford Hospital in Detroit. During this time his place was taken by Vernon L. Hart. Perhaps no one clinic in the Hospital has experienced such fluctuations in numbers seeking diagnosis or treatment as has the bone and joint clinic, largely because of radical changes in legislation offering medical care for children, such as the withdrawal and drastic curtailment of funds.

Although the oral surgical unit is in the Hospital, it is not under the immediate direction of the Department of Surgery. Chalmers J. Lyons, who was made Instructor in Oral Surgery and Consulting Dentist to the Hospital in 1919, succeeded Darling in this field and was largely responsible for the establishment of this important clinic. After his death in 1935 he was succeeded by John W. Kemper, Professor of Dentistry and Consulting Dental Surgeon to the Hospital, who is now in charge of oral surgery. In this ward hundreds of children have had opportunity for the surgi-

cal correction of mouth malformations.

Dr. Cabot was succeeded as head of the surgical clinic in 1930 by Frederick Amasa Coller, who had come to the University as Assistant Professor of Surgery in 1920. As chairman of the department, he is responsible for all subdivisions of surgery, and under his administration standards in surgery, as well as teaching methods and content of instruction and research, have been continually improved.

OBSTETRICS AND GYNECOLOGY.—The third of what may be called the original clinics was that of obstetrics and diseases of women and children, which was at first established under Abram Sager, one of the founders of the Medical School. He was succeeded in 1873 by Edward S. Dunster, who was followed by his assistant, James N. Martin, as Acting Professor in 1888. "Children's diseases" was dropped from his title when Martin was made Professor in 1891, but was nominally included in his duties when, in 1899, he became Bates Professor of Diseases of Women and Children.

Reuben Peterson became head of the department in 1901 and remained in charge until his retirement in 1931. During the first five years of his administration, the clinical material nearly doubled. Peterson was succeeded in 1931 by Norman Fritz Miller as Professor of Obstetrics and Gynecology and Bates Professor of Diseases of Women and Children. He became chairman of the department in April, 1938.

Although obstetrical clinical material had been plentiful for some time, radical changes in legislation (1933) shifted the assignment of cases from the University Hospital to local units. This and other causes contributed to a decline in the number of cases received at the Hospital and created a problem in supplying adequate clinical material for student instruction.

OPHTHALMOLOGY AND OTOLARYNGOLOGY.—With the coming of George E. Frothingham to the University in 1867, a special interest arose in ophthalmology and aural surgery. When Frothingham became Lecturer in Ophthalmology in 1870, a clinic in these branches was developed under his direction. The unusual importance attached to this branch of surgery was indicated by the fact that the first University building designed for a special clinic was a small Eye and Ear Ward, added to the campus Hospital in 1881.

Apparently, no special provision was made for this clinic in the Hospital on Catherine Street until Walter R. Parker and Roy Bishop Canfield were appointed, respectively, to the professorships of ophthalmology and otolaryngology in 1904. They realized at once that efficient work in their specialties was not possible while patients were treated in a general ward where they were in contact with septic cases. They began a campaign for a new building, which was eventually built in 1910. From that time the clinics in both of these subjects expanded rapidly.

The removal of the ophthalmology clinic to the new Hospital took place under Parker, who continued as Clinical Professor of Diseases of the Eye, until his resignation in July, 1932. He was succeeded by his associate, George Slocum, upon whose death in 1933 F. Bruce Fralick became Acting Chairman of the Department of Ophthalmology and in 1938 Professor of Ophthalmology and chairman of the department.

Originally, the clinic treated diseases of the ear, nose, and throat, as well as those of the eye, but in 1904 Canfield became Professor of Otolaryngology and head of the otolaryngology clinic. Under his energetic direction and because of his extraordinary skill as a surgeon, the clinic grew rapidly. Canfield, who was

killed in an automobile accident in 1932, was succeeded by Albert C. Furstenberg, who had been for many years his able assistant.

PSYCHIATRY AND NEUROLOGY.—The history of the development of the Hospital clinic in neuropathology goes back to the time of William J. Herdman, who had assumed charge of the work in nervous and mental disorders in 1888. Just before his sudden death in December, 1906, he had recommended the appointment of Dr. Albert M. Barrett who in September, 1905, had taken charge of the instruction in psychiatry and diseases of the nervous system. A clinical professorship of the diseases of the nervous system was also created. In June, 1907, this was filled, on Barrett's recommendation, by Dr. Carl D. Camp.

At the time of his appointment Dr. Barrett, who thus had the distinction of carrying out and organizing the first University Hospital clinic for the treatment of mental diseases in the United States, issued a statement about the work in the two divisions, psychiatry and neurology, as follows:

The Psychopathic Ward is a hospital intended for the so-called psychopathic conditions or for mild forms of mental diseases. This means that there will always be present in this Ward, patients which might properly belong either to the neurologists or the psychiatrists. . . . The Director of the Psychopathic Ward in his capacity of Pathologist of the State Asylums, visits these institutions from time to time and has become familiar with much of their more interesting clinical material. . . . (MS, "Medical Faculty Minutes," 1905-10, p. 290.)

Under Barrett, the clinic grew rapidly. It was centered in the State Psychopathic Hospital, which was connected with the old Catherine Street Hospital. An additional clinic was established in the new Hospital in 1925. Upon Dr. Barrett's death in 1936, he was suc-

ceeded by Raymond Walter Waggoner, who, as Medical Director of the State Psychopathic Hospital, was placed in charge of the neuropsychiatric unit in the University Hospital. The Neuropsychiatric Institute was built in 1939 as a separate building just to the rear of the Hospital proper. The old State Psychopathic Hospital eventually was fitted over as a nurses' home. The clinic in neurology, which was separated from that of psychiatry in 1920 when the separate Department of Neurology was created, remained under the charge of Dr. Camp.

ROENTGENOLOGY.—Although interest in X ray as an agent in diagnosis developed in the Medical School soon after Roentgen's discovery in 1895, the clinic in roentgenology was not inaugurated until December, 1903. It was first installed in a five-room laboratory in the basement of the Palmer Ward and was furnished with X-ray equipment purchased the year before. From the first the work of the laboratory, devoted to X-ray diagnosis, therapy, and photography, increased enormously.

Work in this field was at first under the charge of Vernon J. Willey, who became Director of the laboratory in 1906. X-ray therapy was conservatively practiced at first as a joint undertaking with the Department of Dermatology; little deep therapy was attempted. In 1909, Lyle Steen Hill became Director of the laboratory, which by this time had become of great value in the diagnosis of fractures, dislocations, and bone diseases, as well as in the localization of foreign bodies.

In 1913 James G. Van Zwaluwenburg became Clinical Professor and later Professor of Roentgenology. The clinic had become more than self-supporting so that the appointment of a technical assistant was authorized, and the clinic became a full-time service of the Hospital.

Dr. Van Zwaluwenburg died January 5, 1922, and was succeeded by Samuel Wright Donaldson, who was acting head until the appointment of Preston Manasseh Hickey a few months later.

The design for the roentgenology clinic, in the present hospital, with its special examining rooms and photographic equipment, was the work of Dr. Hickey, who was in charge at the time of removal to the new building. The facilities of the clinic were also increased in 1928 by a purchase of 100 milligrams of radium for \$7,000 under a general appropriation of \$35,000 for a radium and emanation plant. Dr. Hickey died in 1930, and his place was taken temporarily by Carleton Barnhart Peirce, who was, in turn, succeeded in 1931 by Fred Jenner Hodges as Professor of Roentgenology and later chairman of the department.

Under Hodges' direction many changes have been made in the arrangement and equipment of the clinic, which is now situated on the east side of the surgical wing. In May, 1940, the W. K. Kellogg Foundation provided funds for the installation of equipment for chest X-ray examinations of patients admitted to the Hospital, for clinical investigation, for the study and prevention of tuberculosis, and for research toward the more efficient uses of X ray for diagnosis.

DERMATOLOGY AND SYPHILOLOGY.—The dermatology clinic was the last of the major clinics to be developed in the Catherine Street Hospital. When William F. Breakey, Professor of Dermatology and Syphilology, resigned in 1912, he was succeeded by Udo J. Wile, who remained in charge of the department and of the clinic. A laboratory for dermatology was set up in the basement of the medical building of the old Hospital in 1912, but it proved inadequate. Wile almost immediately called attention to the fact that although the bed

capacity for the treatment of syphilis cases was far larger than that found in any other institution of like character, there was urgent need for additional bed space. Accordingly, the construction of a special ward was authorized in 1917. It was of temporary character, however, and was used only until the new Hospital was completed, when more satisfactory quarters for the clinic became available.

SPECIAL CLINICS AND RESEARCH PROGRAMS.—From time to time there have been additions to the facilities of the Hospital in the way of special clinics and research programs developed in co-operation with different members of the medical faculty. Among these are to be noted new clinics in allergy, arthritis, cancer, and the Clara Ward Seabury clinic in infantile paralysis.

A sensitization clinic organized in the basement of the old Contagious Hospital grew into a much larger clinic after it was moved to the new Hospital. General interest in allergy, at first a subject of doubt and ridicule, was increasing, and an allergy clinic was developed within the Department of Internal Medicine under the direction of Dr. John Sheldon.

In 1936 a teaching clinic for the study of malignant growths was created through the combined efforts of all the professional departments of the Medical School. The work has been correlated with nuclear research carried on with the physics and the roentgenology departments, with financial support from the Rackham Fund.

The arthritis clinic was organized in 1935 at the suggestion of Dr. Sturgis and Dr. Badgley to co-ordinate various methods used in the Hospital for treatment of arthritis. Three years later a trust fund of \$1,000,000 was established by the Rackham Fund for the furtherance of research in this field. This support resulted in the development of an arthritis unit in the basement of the Hos-

pital, with Richard Freyberg in charge.

A gift of \$8,000 from anonymous donors in 1937 made possible the establishment of a memorial clinic to Mrs. Clara Ward Seabury for the study of infantile paralysis. This research clinic was placed under charge of Malcolm H. Soule, Professor of Bacteriology and Chairman of the Hygienic Laboratory.

Several services directly related to the clinics, and functioning in co-ordination with them, are the pathological diagnostic service, the clinical laboratories, the Department of Anesthesia, the Hospital Pharmacy, and the dietetic, physical therapy, and blood bank services.

PATHOLOGY.—The pathological service was first organized in 1900 under Aldred Scott Warthin, at that time Chairman of the Department of Pathology. Under his administrative direction it was enlarged, and offices and laboratories were provided for it in the basement of the new Hospital. This service gave ample proof of Dr. Warthin's assertion that in a single year the Hospital's clinical material covers almost the entire range of practical diagnostic pathology and gives the Hospital a unique teaching and research value quite different from that of the ordinary city hospital. When Warthin died in 1931, he was succeeded by Carl Vernon Weller.

The growth of the clinical laboratory and of the consultation services coincided with the emergence of the Hospital as one of the outstanding medical centers of the country. In March, 1928, Dr. R. L. Kahn was made Director of Laboratories and Assistant Professor of Clinical Bacteriology and Serology. His researches and clinical tests have been internationally recognized.

ANESTHESIA.—In 1919 Miss Laura M. Davis, the anesthetist of the Hospital, organized a course for graduate training in anesthesia. She continued as director

of the course until 1938, when Fenimore E. Davis was placed in charge of a newly organized Department of Anesthesia established in the Department of Surgery.

The first appointment of a Hospital dietitian was apparently made in 1901, and from that time increasing emphasis was placed on adequate and proper diet for patients. A more scientific approach to the subject, however, was not undertaken until the establishment of the diet therapy clinic under S. Margaret Gillam, who, as Director of Dietetics, worked closely with Dr. Newburgh and others in the study of diet and metabolism. Miss Gillam resigned in 1932 to be succeeded by Mrs. Dorothy Stewart Waller, who was also Instructor in Internal Medicine. Upon her death in 1934, Miss Mable M. MacLachlan was appointed Director of Dietetics and Housekeeping.

A metabolism unit with twelve beds was opened in 1922 under the direction of Phil Lewis Marsh. This included a well-equipped kitchen and a small laboratory for the treatment of diabetics and the intensive study of patients presenting disturbances of metabolism. With removal to the new Hospital, this unit was greatly expanded.

A gift from the Rackham Fund in 1934 for the construction of a therapeutic pool greatly strengthened the facilities of the Department of Physical Therapy. It now occupies an entire wing of the basement floor and is one of the best equipped and most modern units in the country.

In 1938-39, the establishment of a blood bank in the Hospital was announced, and a member of the Internal Medicine Department was charged with developing the service. The bank is situated on the ground floor of the Hospital, and each service has a separate account for credit and withdrawal of blood from the bank.

ADMINISTRATION AND POLICIES

In the memorandum outlining the functions of the Hospital drawn up by Dr. Abram Sager in 1869, certain fundamental principles were set forth, although it required time for some of them to be realized effectively. Dr. Sager assumed that the University "did not on the one hand design to offer [the Hospital] as a public charity, nor on the other, intend rigidly to restrict its benefits to those who were competent to meet the necessary charge for maintenance." He suggested that "the main object of a hospital . . . is to utilize for practical instruction all the clinical material that may present itself." With these objectives in view Sager suggested that the Hospital should be kept open throughout the entire year. This was twenty-four years before the University summer session was opened, and thirty-three years before the summer session in medicine was begun in 1902.

No person was to be admitted for treatment except upon his willingness to contribute directly or indirectly to the "main object of the institution." No patients should be admitted who were not willing to be utilized for class instruction.

The general management of the Hospital was to be under the control of the medical faculty, with the patients under the charge of the Hospital staff "consisting of the Professors of the Practical branches of the University." It was also suggested that "the charge for maintenance should be placed at the lowest rates consistent with the avoidance of actual loss." This last provision was for many years a bone of contention between the Regents and the clinical faculty, especially in later years when the cost of hospital care was largely augmented. The Regents insisted that the Hospital be self-supporting; the clinical faculty always maintained that low charges were

necessary to furnish the maximum amount of teaching material. Thus, for many years, the Regents maintained financial control of the Hospital's operations, and the medical faculty exercised immediate supervision over admission of patients and educational policies.

Whether a medical school should own its own hospital or utilize affiliated institutions has been much discussed during the past fifty years. Naturally, every school has defended its own system. To many, the use of a hospital by a medical school without the problems incident to its control appears advantageous. In reality, there always have been difficulties. President Charles W. Eliot observed in his report for the year 1888:

The School [Harvard Medical School] labors under some disadvantage because it has no official influence over the appointments in any hospital. It receives indispensable aid and furtherance from all the principal hospitals and Infirmaries in and about Boston, and it has always been in especially intimate relations with the Massachusetts General Hospital; nevertheless, there is not a single hospital, infirmary, or dispensary over the appointments in which it has the least control. Yet no clinical teacher in a medical school can do his work properly unless he has rightful access to a large hospital or infirmary. When, therefore, a vacancy occurs in some clinical department of teaching in the Medical School, the question before the Governing Board of the University is—not who is the most available man for the place in Boston or elsewhere—but who is the most available man as a teacher among the Boston practitioners already holding cognate hospital appointments given by other Boards of Trustees. (Harrington, p. 1079.)

The principle that the Hospital ought to be self-supporting had much to do with the remarkable success of the Medical School. Charges were to be so fixed that the Hospital was to pay its own way and was to be no financial burden

upon the University. It was not possible to carry out this program completely, and after the first few years state appropriations for maintenance supplemented the income from patients for board, medicine, unusual appliances, and special nursing. This state support, first provided in 1877 to enable the Hospital to keep open during the summer term, was continued through the summer of 1918. In 1892 the superintendent stated that his current report included only running expenses, not maintenance or permanent expenses (*R.P.*, 1891-96, p. 104), though just what the difference was between maintenance and running expenses is not clear. Since 1918 the principle of self-support has been followed with a fair degree of consistency, with deficits in one year balanced by increased income in others. Without the rigid adherence to this rule in recent years one can imagine the mounting expense of the present Hospital of some 1,350 beds, with an annual budget, in 1940, of more than two million dollars.

During the period while the new Hospital was in the course of construction and immediately after it was occupied, the question of full-time service on the part of the clinical members of the Hospital staff was under serious—and sometimes heated—discussion. The faculty had voted in June, 1919, that the chairs of surgery and internal medicine should be filled by teachers giving full-time service to the University, with a salary from University funds supplemented by a further amount from the income of the Hospital. The appointment of Dr. Hugh Cabot as Professor of Surgery in 1919, an active advocate of the plan, made certain its adoption at Michigan, even though many members of the medical faculty were doubtful about its desirability or practicability.

In a statement made to the Regents by Dr. Cabot in January, 1920, he de-

fined full time as "the requirement on the part of members of the Department of Surgery to give their whole time to teaching and to the care of patients at the University Hospital." By this plan, he maintained, teachers would devote their entire time and thought to the work of the Hospital, and the resulting conflict between duty to the University and the support and education of a family would be avoided. He pointed out that the income of a teacher in a clinical service arose from two sources, his work as an instructor and his "market value" as a practitioner of medicine. This fact must be recognized in assessing a proper income for such teachers, or the best men would be unwilling to limit their incomes to the ordinary University professorial salaries. He proposed that while his salary as a teacher should be equivalent to salaries in other departments of instruction, the clinical instructor should also be paid an additional amount from patients' fees, to be collected by the University and allocated in accordance with the importance of his medical and surgical services. The amount of the whole compensation should be fixed so that it would bear some relation to the income he would receive as a practitioner.

A few months later, in December, 1920, the Regents adopted a resolution establishing full-time chairs "as soon as the new Hospital building is prepared." In the final event, the plan proved only partly successful. The salaries in the Medical School were criticized by members of the other faculties of the University, while the medical profession in the state was equally critical because of what they felt was a threat to the practice of doctors in local communities throughout the state.

With the opening of the new Hospital, the question was again brought up for consideration, and in February, 1927, the

Regents declared full-time service in the Medical School to "comprehend the policy of using the surplus earnings of the full-time departments . . . for increasing and supplementing expenditures for salaries, supplies, and equipment." Nevertheless, the whole question continued to be a vexing one, and in May, 1929, a committee composed of Regents, members of the medical faculty, and University officers was set up to study and report on the problem. This committee reported informally from time to time, and their consideration eventually led to a resolution on the part of the Regents that on and after July 1, 1932, full time should "cease to be mandatory in the clinical departments" (*R.P.*, 1929-32, p. 868). Within a few years after the passage of this measure, the status of some members who had been serving on a full-time basis had been changed to part time.

The question of part-time service had been affected also by the fact that throughout the early years of the Hospital little or no accommodation was given to private patients. After 1881 patients were those referred to the Hospital from the local communities or by the state. This restriction upon the patients admitted to the Hospital gave rise to the establishment of other hospitals in Ann Arbor. These included a number of private hospitals maintained by members of the University's medical staff. With the coming of Dr. Cabot a few private surgical patients were admitted to the Hospital, and the situation was finally clearly defined in December, 1932, when the Regents approved special provisions on two floors of the surgical wing for the private patients of part-time members of the faculty. In 1939-40, a little more than 41 per cent of the patients were referred by physicians or were University students. A relatively small number (about 3 per cent) were

employees of the Hospital; the remainder were admitted to the Hospital under the various state laws for indigent adults and children.

HOSPITAL SUPERINTENDENTS.—When the first little hospital was established on the campus in 1869, John Carrington became janitor or steward (the terms appeared interchangeably), and his wife was matron. He was to prepare the dietary for the hospital patients, keep the fires, and care for the rooms and beds, in return for which he and his family were to "have residence" in the Hospital and receive seventy-five cents per week for each patient. Another couple continued this arrangement for a year or so. After that for a period of some fifteen years, there is no record of a hospital steward, but in 1874 the position of hospital physician was created. It was first held by Dr. Robert J. Peare, denominated by Dr. Sager as "the physician in immediate charge of the inmates." Dr. Alexander C. Maclean was appointed Hospital Surgeon in 1877 and was also designated Hospital Superintendent, with the understanding "that he shall be furnished a room in the building . . . and also contingent upon his assuming the general control of the work of the matron" (*R.P.*, 1876-81, p. 125).

The increasing number of patients and the difficulties of satisfactory administration under this system led eventually to a series of recommendations by the medical faculty submitted to the Regents in June, 1888. Among other measures, it was suggested: "That the price of board be raised to four dollars per week, . . . That a competent matron and steward be engaged to conduct the culinary department, . . . and that the present system of boarding patients . . . be abolished." In December, 1888, the auditing committee reported that they had selected Joseph Clark as

steward of the hospitals at a salary of \$1,000. Two and one-half years later he was given the title of Superintendent of the Hospitals, including the Homeopathic Hospital.

On completion of the Catherine Street Hospital group in 1891, a series of new rules and regulations provided that the superintendent should have charge of admitting and discharging patients and should also keep records of patients as well as a property inventory, provide for the patients' diet, hire all servants, collect all moneys from patients, and have oversight of each department of the Hospital (*R.P.*, 1886-91, p. 532).

This was the beginning of a more systematic administrative policy. Clark continued to serve until his death in 1897, when he was succeeded by his son, Harry W. Clark, upon whose resignation in 1900, E. S. Gilmore became superintendent. Gilmore, in turn, was followed in 1908 by Jay B. Draper, who had previously been superintendent of the Pontiac Asylum. Draper was hard-working and conscientious, but apparently had little administrative ability. A rigid policy of making the Hospital "pay its own way," although it resulted in a surplus, gave rise to many complaints and was responsible for a general decline in efficiency and morale.

This condition led to an investigation by a committee of the medical faculty, which reported that in all medical affairs the Hospital should be under the direction of the medical faculty. There had been hospital committees of the medical faculty before the Catherine Street Hospital was built, but their powers were limited, particularly in the matter of finances. As a result, with the approval of the Regents, a new Hospital committee, with extended powers, was created in January, 1912. Dr. Reuben Peterson was made Medical Director, with Dean V. C. Vaughan and Dr. De

Nancrède, Dr. Hewlett, Dr. Canfield, and Dr. Barrett as the other members.

This committee, eager to improve conditions, found that their efforts were still limited by the fact that they had no direct control of Hospital finances, which were administered by the Regents. Although friction was bound to result, this system of control worked with fair success until it was given up in 1918. That it worked at all was probably due to the support of Dr. Walter H. Sawyer, chairman of the Regents' Hospital Committee, to whom the Board naturally turned for advice. Then too, any plan of management would have been strained to the breaking point by World War I and the confusion resulting from the enlistment of a great part of the Hospital staff.

A summary of a report made to President Hutchins by the Medical Director in 1915, outlines the general situation of the Hospital at that time. In this report it was pointed out that the reorganization of the Hospital along modern lines was no easy task, since, under nonmedical management, the unsanitary condition of the old building had resulted in many cases of erysipelas, tonsillitis, and bronchial infections among both patients and nurses. This condition had been remedied and the Hospital had been made clean and sanitary, reducing these avoidable diseases to a minimum. One of the best general kitchens in the state had been installed, as well as a bakery, ward serving-rooms, and a nurses' diet kitchen.

The report also stated that the new Interns' Home had obviated the humiliation of losing the best senior students as interns to other hospitals. A Hospital usher who received patients as they entered and saw that they were escorted to the proper departments, also ended many complaints. An increase in the teaching and supervisory staff of the Training School for Nurses made unnec-

essary the use of outside nurses unless they were employed by the patients. A trained social service worker, first appointed in 1912, also gradually changed the general tone of the Hospital, bringing the patients to feel that the authorities were interested in them as well as in their bodily ills. Moreover, the twenty-four bed Contagious Disease Hospital brought relief from financial loss caused by quarantines arising from the presence of contagious diseases in the wards. Compulsory Wassermann examinations were given free of charge to all Hospital patients.

As a result of these progressive measures, a deficit incurred in the years 1911-14, because of the increased number of patients, became a surplus in 1914-15. The report mentioned many inadequacies in the plant and emphasized the impossibility of making it over into a modern hospital. It also called attention to the need for a new nurses' home. Despite these deficiencies and handicaps, the report concluded that the institution was as good a teaching hospital as existed anywhere in the country. One great advantage in the increase of control on the part of the Hospital committee lay in the knowledge thus acquired by the faculty members of the committee of the difficulties of hospital management.

Superintendent Draper was killed in a streetcar accident on November 13, 1915, and Robert G. Greve, then in the office of the Secretary of the University, was appointed temporary Superintendent of the Hospital. He held the position until 1918. This was a period of peculiar difficulty because of the problems arising from World War I and from the limited number of nurses, especially during the influenza epidemic of 1918. Moreover, the war also placed those connected with the Hospital in a peculiarly embarrassing position, because the faculty, as teachers, were urged to remain at their posts in

order that the Army would be assured an adequate supply of doctors, whereas the War Department naturally welcomed enlistment of highly trained doctors and surgeons in the Army Medical Corps.

When it was evident that war was imminent, this situation was discussed at a meeting of hospital clinicians held in March, 1917. A statement was drawn up by this group pointing out that the Medical School, in its clinical program, differed from other schools, since its staff was never more than sufficient to ensure good medical and surgical care. The staff at that time included forty-one physicians, all of whom were members of the medical faculty, and their teaching duties were necessarily closely interrelated with the care of their patients. A loss of eight men (20 per cent of the staff) was the maximum depletion that could be allowed if the clinical teaching program were still to be maintained. Reduction of the faculty beyond a certain point would either limit the number of admissions to the Hospital, with a corresponding lessening of service to citizens of the state, or else result in inadequate instruction and the lowering of standards in the treatment of patients.

The members of the staff expressed their willingness to do what was best for the country and signified their readiness to serve in the Medical Officers' Reserve Corps, although it was suggested that a plan be devised which would prevent too serious a reduction of the teaching staff. But, as the war progressed, conditions in the Hospital became worse, and eventually the personnel was depleted by nearly 50 per cent.

When the new and greatly enlarged University Hospital became a certainty in 1917, it was evident that the old system, under which a member of the medical faculty served as medical director, was inadequate and that a medical superintendent and director should be

secured who could give his whole time to the administration of the Hospital. Dr. Peterson, then absent under an Army commission, accordingly resigned, and Dr. Christopher G. Parnall, of Jackson, Michigan, a graduate of the Department of Medicine and Surgery in 1904, and experienced in hospital executive work and instruction, was made Medical Superintendent and Director in April, 1918, with the expectation that he would give his whole time to the affairs of the Hospital. Somewhat later he was also made Professor of Administrative Medicine.

In Dr. Parnall's first annual report, which covered the year ending June 30, 1919, it was pointed out that the University Hospital had become one of the great teaching hospitals of the country. Despite yearly admissions numbering nine thousand and an equally large number of outpatients, there was a long waiting list, especially in the surgical service. The Hospital served, in effect, as an infirmary for the entire state, with patients referred to it from every county—particularly from those without adequate hospital facilities. Dr. Parnall served as Superintendent until 1924. During his term of office he promoted many new ideas in organization and administration and was responsible for the planning and designing of the present Hospital building.

After Dr. Parnall's resignation Mr. Greve again served for a short time as Acting Director prior to the appointment of Dr. Harley A. Haynes, who came to the Hospital after many years' experience as director of the State Hospital at Lapeer. In the course of his tenure many radical changes took place in the policies and administration of the Hospital and in its organization in relationship to the University. Dr. Haynes's institutional experience helped him to keep the Hospital doors open during legislative and financial difficulties, during panics and

war, and aided him in the solution of multiple problems ever present in such an institution.

Shortly after Dr. Haynes was appointed, Dr. Albert C. Kerlikowske ('24m) became Chief Resident Physician and, in 1928, Assistant Medical Director of the Hospital.

DEVELOPMENT OF INTERN SYSTEM.—Throughout the early years of the Hospital, the problem of interns, or house physicians, was never satisfactorily settled. Although essential to the proper conduct of a hospital, for many years they occupied an inferior position and were more or less looked down upon by the hospital chiefs. By 1890, however, it came to be recognized in medical schools that experience was a valuable asset for young doctors before they went into practice.

Thus, although the beginnings were very modest, a system of internship gradually developed. A Hospital physician, later called resident physician, was first appointed in 1874 and doubtless performed many of the functions of an intern. In 1895 both a house physician and a house surgeon were listed in the *Announcement*. The first interns under that designation, four in number, were listed in the *Calendar* for 1899-1900 and were given a salary of \$125 a year with room and board.

For some years after those first appointments the intern system was far from satisfactorily organized. Some ambitious students in applying for positions as interns secured recommendations to more than one hospital, leaving to their faculty sponsors the duty of explaining their failure to accept appointments in other hospitals to which they had applied. This led, of course, to great confusion.

To meet this situation the medical faculty in 1911 appointed a committee to systematize the entire program. To

this committee, composed of Dean Vaughan, Dr. Hewlett, and Dr. Peterson, all requests and recommendations for internships were to be referred. Dr. Peterson in laying the matter before the Council on Medical Education of the American Medical Association reported that the committee felt that a firsthand knowledge of the best hospitals throughout the country should be obtained and that appointments to positions in these hospitals, as well as certification of the students' fitness, should be made. A plan for a fifth clinical year in the medical curriculum at Michigan was considered, but was never put into practice.

The admission of students to internship in the Hospital was thus gradually systematized. The situation was strengthened in 1922 by the passage of a law requiring all medical graduates to serve one year in an accredited hospital before beginning to practice. In 1940 thirty-five interns were on the Hospital staff. They rotated among the various clinical services. There were also approximately forty assistant residents, who served for a second year, and thirty resident physicians, who stayed for a third year.

As the University Hospital expanded and more and more interns were required the question of adequate quarters for them, as well as for the house physicians, became pressing. An old residence, moved to the Hospital site, was made over into an interns' home in 1914 at a cost of \$2,500, and three years later an enlargement was authorized, so that the building accommodated fourteen men. The third floor of the Hospital Administration Building was also used, as well as a near-by residence taken over for the purpose. These makeshifts were so unsatisfactory, however, that in 1939, a new building for interns, housing some seventy-five men, was erected at the rear of the main Hospital building.

MEDICAL MUSEUMS AND MEMORIALS.—In 1935, largely at the suggestion of Dr. Peterson, it was decided to start a collection of medical and surgical apparatus which had been in use in the Hospital. Cases containing items of interest were placed in the teaching amphitheater and in a small room off the Hospital library. The material thus exhibited includes instruments, splints, stethoscopes, and old X-ray equipment.

To preserve the memory of some of the men whose lives were an inspiration in the organization and development of services within the Hospital, from time to time memorial tablets have been placed on walls within the Hospital. These memorial tablets have thus commemorated the services of Regent Wal-

ter H. Sawyer, Albion W. Hewlett, James G. Van Zwaluwenburg, George E. Frothingham, Aldred S. Warthin, A. B. Palmer, and Reuben Peterson.

It would be impossible to enumerate the many generous gifts which the Hospital has received over the years, all expressing the particular interests and desires of the donors. They comprise buildings, research and teaching funds, scholarships and fellowships, as well as small individual gifts, all of which have contributed to the development and growth of the Hospital and its services to thousands of patients.

REUBEN PETERSON*
WILFRED B. SHAW

* Died November 25, 1942.

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THE RELATIONSHIP OF THE HOSPITAL TO THE STATE

In the year 1939-40 the University of Michigan Hospital received 26,728 patients. Of these, 6,619 were to some extent dependent on the counties or on the state, and the expenses of 715 other patients were guaranteed by public officers and payable from public funds (*P.R.*, 1939-40, pp. 308-9).

Although the University Hospital opened in 1869, it received no state support until 1875, and only since the 1880's have there been laws governing the care and maintenance of public patients. Nevertheless, as early as 1859 the concept of a state almshouse to be maintained by the University for clinical as well as charitable purposes was presented to the Michigan State Medical Society.

Ten years later, when the Regents were planning a hospital, the medical faculty set forth the scope and purposes of the institution, stating that its main object should be "to utilize for practical instruction all the clinical material that may present itself" and adding that they believed the Regents neither designed it to be a "public charity" nor meant to restrict its benefits only "to those who were competent to meet the necessary charge" (*R.P.*, 1864-70, p. 366). A maintenance charge sufficient to cover food and medical and surgical supplies was recommended, and all patients were

to be utilized for clinical instruction. The medical faculty was to have general control.

Summer operation of the Hospital was postponed until 1878, although at that time there was no instruction during the summer. Until 1872 charges to patients covered only their food. After that date all except "paupers" paid for medical supplies.

References to "paupers" and "charity patients" seem to indicate ability of the patients in some cases to pay for food and supplies, but the scanty records are not clear. Indigent patients must often have found even nominal fees impossible, especially in cases of long or chronic illness. Since medical service was free, fees from the well-to-do could not have provided for the poorer patients, and yet the Hospital was attempting to maintain itself from fees adjusted to the actual cost level. How this difficulty was solved, the records do not state. Possibly, charitable agencies maintained some patients.

The year in which the Hospital was established, Henry P. Baldwin, a Detroit philanthropist, became governor of the state. He had visited jails and county almshouses and had been shocked by the unsanitary conditions, lack of medical care, and nonsegregation of criminals. He was aroused over the conditions of children forced to remain in these places of ignorance, disease, and crime. Illnesses which might have been temporary often

went untreated, eventually became incurable, and made patients permanently dependent on public funds.

Governor Baldwin secured the appointment of a state investigating commission, the adoption of children into normal homes, and the authorization of a central school to care for them before adoption, thus avoiding the county almshouse. He also demanded a remodeling of the state's charitable and penal systems. The state public school thus established in 1871 was opened at Coldwater in 1874, the first institution of its kind in the United States. In 1879 the investigating commission became the State Board of Corrections and Charities and so remained until 1921, when it was replaced by the Department of Social Welfare.

While this commission was examining the county almshouses, a committee of the University medical faculty reported, in 1870, on the first year of operation of the Hospital. Although additional beds had been secured during the year the Hospital had been filled to capacity, and the committee recommended a large state hospital in connection with the Department of Medicine and Surgery. While there were no immediate results of the proposal, discussion of the plan undoubtedly had some bearing on later developments.

A "state almshouse hospital," on the general plan of such institutions in Massachusetts, was proposed. Free medical service and medicines prepared inexpensively by the pharmacy were offered the state for its invalid poor in return for the benefit of clinical material. The commission believed that with help from the legislature such a plan would be feasible.

The Regents, however, were slow to act on this recommendation, although a committee conferred with Governor Baldwin's commissioners. Then a new

Regent, Dr. Charles Rynd, serving as head of the committee on the Medical Department, reported unfavorably on the value of large hospitals for instruction, preferring the old preceptor system.

Later, however, the committee changed its view, for in the spring of 1872 (*R.P.*, 1870-76, pp. 189-91) it strongly urged the establishment of a large state hospital at the University, the best place "in the West" for pursuing the "higher clinical field of thought." It requested a large and modern hospital:

Not only are our almshouses the repositories of many persons who are thus incarcerated to languish, suffer on and die without that aid to which the suffering poor are justly entitled, but many persons of wealth and refinement labor from diseases which if treated at all by the private practitioner, are treated but poorly, and with indifferent and unsatisfactory results. (*R.P.*, 1870-76, p. 189.)

President Angell, in 1872, made a vigorous plea for a state hospital for almshouse patients or a large hospital for special diseases, the funds to come either from private or from public benefactions. At the same time Dr. Alonzo Palmer reported the medical faculty's views to the Regents and promised to have a hospital plan ready for consideration at the next meeting.

A joint committee of Regents and faculty members was then appointed to confer with the governor's committee on state charities. This joint committee discussed the necessity for such a hospital and favorably considered a proposal to build it at Ann Arbor, but it was not deemed "judicious to ask for an appropriation" (*R.P.*, 1870-76, p. 251). Possibly some new difficulty in the controversy over the proposed homeopathic school made the University reticent in pressing any demands for state funds. When the Homeopathic Medical Col-

lege was established three years later, the legislature contributed several thousand dollars toward the construction and equipment of a larger and more modern University Hospital, provided a stated amount could be raised in Ann Arbor.

Act No. 207 of 1875, granting funds for the old Pavilion Hospital, was the first specific appropriation for the University Hospital, henceforth called a "state hospital." Though no funds were provided for running expenses, it did set a precedent for a series of future appropriations separate from grants for buildings and equipment. These were also distinct from somewhat later state disbursements made under public-patient laws.

No sooner was the new building completed in 1876 than the faculty requested, as it had in 1869, that the Hospital remain open throughout the year and that the medical session be extended from six to nine months. These requests were approved by the legislature in May, 1877.

During the vacations of 1878, 1879, and 1880, the Hospital remained open, but for the following eleven years it was closed in the summer, although the appropriations by the legislature continued, averaging until 1891, about \$4,000 a year. Throughout this period these grants were used for Hospital running expenses. In the year 1891-92 the Hospital received \$10,000 from the state in addition to funds for the new Hospital on Catherine Street, then in the course of construction. The following year an additional \$8,000 was received for salaries and general expenses, but no direct grants for expenses were made during the next four years.

The opening of the Catherine Street Hospital in 1891 brought a marked increase in receipts, but, nevertheless, over the four-year period, 1893-97, there were regular deficits to be made up from

the University's general fund. Despite financial difficulties, however, the Regents directed that the Hospital be kept open in summer, although the effects of the nationwide financial crisis in 1893 forced its closure during the summers of 1895 and 1896.

Relief came in 1897, when Act No. 203 provided \$3,000 a year regularly "for the use and maintenance" of the University Hospital and the Homeopathic Hospital, provided the hospitals were operated during the summers. Though this law has never been repealed, it remained in practical effect only until July, 1919. After that date the payments were refunded to the state, and whatever annual deficits have been incurred have been offset by the surpluses of other years.¹

FIRST PUBLIC-PATIENT LAWS, 1881-97.—The metamorphosis of the University Hospital into a state hospital accommodating many public patients has been slow. There have been three types of public-patient laws: those for children, those for adults, and those for either adults or children suffering from certain specified disorders. Of these, only the first two types came before 1900.

The board in control of the State Public School at Coldwater first advocated state laws for hospitalizing public patients in the University Hospital. The secretary of this board wrote to President Angell in 1878, suggesting that it would afford great relief to the Coldwater school if the state would provide for dependent children afflicted with chronic diseases requiring surgical operations, since they were not admissible to the school and had of necessity to be returned to the poorhouses, where they could receive no proper treatment. He

¹ The grants for the running expenses of the Neuro-psychiatric Institute in recent years constitute another exception to the rule of self-support.

suggested that the Regents might recommend appropriate action to the legislature and that the "State Hospital at Ann Arbor" was the proper place for such patients.

This letter was printed in full in the Regents' *Proceedings*, but the committee on the Medical Department reported that they had no funds for such a program. They promised, however, to join in a request that such children be provided for, and eventually the two boards secured the passage of Michigan's first law for the treatment of the invalid poor in the University Hospital, the children's act (No. 138) of 1881.

This act provided not only for sick and diseased children from the State School at Coldwater, but for all children suffering from conditions preventing eventual self-support. Transportation, board, nursing, and other expenses were to be paid by the state upon recommendation by the proper authorities, but admission depended upon the decision of the resident physician at the University Hospital as to whether or not the child could be benefited.

Thirteen children were treated under the provisions of this law during the first year, but many were turned away because of the Hospital's crowded condition. Transportation and maintenance for these thirteen children amounted to \$634.68; the following year the corresponding payment was \$434.84.

President Angell made it clear in his report for 1878 that he did not consider the Pavilion Hospital adequate and insisted on aid for adults, as well as for children, pointing out that the University's hospitals had already returned more than their cost to the state.

The Hospital's congested condition was relieved to a certain extent by a legislative grant for an eye and ear ward in 1879, but once more no provision for adult invalids was made. The subject

was not mentioned again until 1888, when certain groups endeavored to have at least part of the clinical work transferred to Detroit. President Angell in opposing such a step emphasized once more the need of a larger and more modern hospital:

It would doubtless be a real economy for the counties, which may now be burdened with the cost of maintaining through life persons who have curable maladies, to send such patients here. To some extent they do this now. But with ampler accommodations more patients could be cared for, and the interests of the counties, of the patients, and of our medical school would at once be subserved. (*P.R.*, 1888-1902, p. 22.)

In 1889 the legislature made a grant of \$50,000 for the new Hospital, to be supplemented by a contribution from the city of Ann Arbor. A note of disappointment tempered President Angell's expression of gratitude. The appropriation would not permit the erection of a large hospital such as had been projected in earlier years, but it was his belief that the clinical facilities might be made "reasonably satisfactory."

At the same session the legislature passed the first state law (Act No. 246 of 1889) for the admission of three classes of adult public patients: those who had become county charges because of severe injury and were in need of special treatment to prevent their becoming permanently dependent; those dependent upon the counties because of acute disease or physical injuries and requiring major operations to preserve life; and such obstetrical cases as were a public charge upon the counties for care and treatment.

Unlike the preceding children's law, this act charged the transportation and maintenance of these patients to the counties and left local enforcement to local officers and physicians. While such medical service to adult county poor to

some extent already was provided, the new law afforded a statutory basis for the procedure and undoubtedly encouraged further use of the Hospital.

Two laws enacted in 1897 authorized further medical aid, primarily for children. Act No. 42 required that the physician attending at the birth of a child of "any indigent poor person" should report, under penalty, any deformity or malady curable by surgical operation. On certification by the proper local officers, the child was to be brought at state expense to one of the University hospitals for treatment.

Under the first children's hospitalization act of 1881, only those enrolled in the State Public School at Coldwater or those who, if restored to health, could enter that school had been admissible for treatment. By an amending act (No. 233 of 1897) the same benefits were extended to any dependent persons in the state schools for the blind, deaf, and feeble-minded, as well as to anyone entitled to enter one of these institutions. Actually, for two years the Hospital had been caring for the children from the School for the Blind at Lansing, at a charge of \$2.50 a week.

This substitution of "dependent persons" for "dependent children" might seem to indicate that a large number of adults would be admitted under the new law, but this was not true, since the state charitable institutions existed chiefly for the benefit of defective children. Nevertheless, this oldest public-patient law is still in effect, and today patients recommended by the Michigan Children's Institute, which took the place of the State Public School in 1935, are treated under its provisions.

FIRST SPECIAL-DISEASE LAWS, 1901-7.—In 1899 President Angell reported that the University had established an informal but valuable relationship with the state institutions for the insane, in each

of which University graduates had been installed as resident pathologists, acting as assistants to the state's head neuropathologist at the University.

There had previously been grants to particular clinics, but until the present century no state provision had been made for the maintenance in the University Hospital of persons suffering from any specified diseases. The first such law was Act No. 161 of 1901, under which the construction of the Psychopathic Ward was begun. It was passed not upon the request nor with the consent of the Regents but in response to the efforts of friends of Professor William J. Herdman, head of the Department of Psychiatry. The Regents, however, accepted the gift, provided the unit be maintained at no cost to the University, and actual construction began in 1902.

The first special-disease law put into full effect was the rabies law of 1903 (Act No. 116), approved a few weeks after the Regents established the Pasteur Institute for the treatment of Michigan residents. It undertook to defray the expenses of indigent persons infected with the virus and assigned to the local boards of health the responsibility of sending them to the University, with transportation and other expenses to be paid by the township, village, or city.

Although the new Psychopathic Ward was practically completed and plans for its administration were under discussion in the spring of 1904, it was not occupied until Act No. 140 of 1905 shifted the payment of the director's salary to the state and introduced partial state control. It specified that a joint board composed of the Regents and the trustees of the state asylums should select a clinical psychiatrist to manage the institution and to oversee the clinical and pathological research in the state asylums and that this same psychiatrist, as a member of the medical faculty, should give in-

struction in nervous and mental diseases. The same act also appropriated \$14,000 for equipment and \$5,000 a year for running expenses for each of the following two years, out of which the new appointee's salary was to be paid.

The following year by Act No. 278 the State Psychopathic Hospital ceased to be a department of the University Hospital and became an almost autonomous state institution. For many years thereafter, under an unusual arrangement, it was conducted in a non-University building on the University Hospital grounds. Its control was vested in a board of eight trustees, four Regents and four asylum trustees appointed annually by the four asylum boards.

Under the two acts of 1901 and 1907 expenses of all public patients except wards of the state were paid by the counties, although whenever possible these costs were to be reimbursed by relatives or guardians. Some public patients were sent by probate judges for curative, preventive, or diagnostic purposes and others came from the asylums. Private patients were also received and cared for at fixed rates.

LEGISLATION FOR CHILDREN, 1900-1913.—Between 1880 and 1910 the population of Michigan almost doubled. During this period measures for the relief of persons only partly dependent became more numerous. An 1889 law for veterans and their dependents gained popularity, and the children's law of 1881 was supplemented by amendment, by legislation for veterans' families, by the juvenile court act of 1903, and by other legislation relative to desertion and broken homes. A 1907 act for dependent, neglected, and delinquent children reflected the growing number of local hospitals, since under it county probate courts were authorized to place any child requiring special medical attention "in a public hospital or in an institution."

This measure might seem to have encouraged local treatment, but the University Hospital was gaining special recognition for its work in pediatrics, and after 1906 the Palmer Ward clinic supplied the impetus for modernizing and amplifying the hospitalization statutes affecting the University. Previous laws were considered inadequate since they provided only for certain classes of persons and "discriminated against the normal child who developed an illness requiring hospital care, in favor of the imbecile who never could be made into a good citizen" (*Hosp. Rept.*, 1918-19, pp. 113-14).

The result was a new children's law (Act No. 274, 1913) which became the model for similar measures in other states. Under its terms deformed or afflicted children whose conditions could be remedied and whose parents could not provide proper treatment were to be reported to the probate judges and cared for at state expense at one of the University hospitals. County agents and superintendents of the poor not on fixed salaries were to be compensated for their time and expense in making the necessary investigations, and the examining physicians were guaranteed a standard fee.

While this 1913 law did not affect the Coldwater State School hospitalization act of 1881, in effect it replaced and led to the repeal in 1915 of the infants' hospitalization act of 1897. Unfortunately, the provision for compulsory report and treatment of deformities present at birth was not included in the new law. The Afflicted Children's Act was in force until the new Crippled Children's Act was passed in 1927.

THE ADULT PUBLIC-PATIENT LAW OF 1915.—Free treatment for adult residents of any Michigan county who would be benefited by medical and surgical treatment but who were financially

unable to obtain it was provided in 1915 by Act No. 267, which also provided obstetrical service for mothers unable to pay for it and for the care of children born of women hospitalized under the statute. As in the children's law, the prospective patient was committed to treatment by a probate judge only after he had obtained a satisfactory financial and medical report, and the expense of the necessary investigation had been guaranteed.

This act for the adult poor specified that transportation and maintenance were to be paid by the counties, which were to reimburse the state for any funds advanced to the Hospital for these expenses. Although University authorities felt that this was a defect, since the county officers might be inclined to send patients to county houses, where they could be treated at less expense, rather than to the University, between July 1, 1915, and June 30, 1940, more than 70,000 patients were registered in the Hospital.

THE EFFECT OF THE LAWS OF 1913 AND 1915.—These new laws for adults and children extended the benefits of hospitalization. In fact, the only important restriction other than that pertaining to medical and financial needs was that the maladies and deformities to be treated could be remedied. The broader scope of these laws and also, possibly, the guarantee of payment of the agents' fees and expenses resulted in a notable increase in public patients. In 1913-14, 255 children were treated under the 1913 children's law; the next year there were 615. In 1915-16, 604 children were treated under this act, and under the 1915 adult law 411 patients were treated; during the following year 707 children and 647 adults were treated. Two years later more adult patients than children were being received under these laws.

PSYCHOPATHIC HOSPITAL LAW OF 1917.—Under Act No. 310 of 1917 the trustees of the State Psychopathic Hospital were given the right to establish centers for the treatment, care, and maintenance of patients at places other than the Psychopathic Hospital and to provide for the preservation of mental health in former patients. A \$3,000 increase in the state's annual appropriation to the institution took care of the additional expense for these new services.

THE CHILDREN'S LAW OF 1921.—A new children's law in 1921 (Act No. 137), primarily affecting local hospitals, empowered the counties to contract with agencies and institutions licensed by the State Board of Corrections and Charities for the care, maintenance, and medical treatment of children, all expenses to be paid from county funds.

SPECIAL-DISEASE LAWS, 1921-25.—A general reorganization of all the public charitable, corrective, and penal institutions was effected in 1921 (Act No. 163), when the State Welfare Department was created to take the place of the old Board of Corrections and Charities. The State Psychopathic Hospital was particularly affected, since the old separate asylum boards were abolished and their powers transferred to the State Hospital Commission, one of four set up within the new department. All non-Regent trustees of the State Psychopathic Hospital were to be appointed by the governor, and while the medical director's functions of visiting and inspecting the other state hospitals were now a part of the activities of the new State Welfare Department, that department was to have no part in the management of the Psychopathic Hospital nor control of its board of trustees.

A new general insanity law (Act No. 151) superseded in 1923 the old Act No. 217 of 1903. It not only defined the functions of the new State Hospital

Commission and of the institutions under its control, but also affected the mode of dealing with State Psychopathic Hospital patients. The same year authorization was given for sterilization operations at the University Hospital (Act No. 258, amended by Act No. 71 of 1925).

The University's Pasteur Institute ceased to be the only clinic in the state for treatment at public expense of persons infected with rabies when, in 1925, Act No. 321 was passed authorizing local health boards to make the necessary arrangements at the Institute or at some other treatment center for Pasteur treatment at an expense to the counties not to exceed \$200 in any one case. It was held by the attorney general in 1929 that this act by implication repealed the old rabies law of 1903 and in effect shifted the costs from cities and townships to the counties. At the same time everyone in need of treatment became entitled to receive it regardless of economic status.

THE ADULT-PATIENT LAW OF 1925.—A new general poor law in 1925 (Act No. 146) repealed the old law of 1869, which had made it "the duty" of county poor superintendents to send to the University county charges who would remain indigent because of severe injury unless specially treated, as well as those who needed major operations to save their lives. While the new law still provided that superintendents of the poor might arrange for the hospital care of such persons, they were no longer compelled to do so. Furthermore, patients might be committed either to the University Hospital or to any other hospital the superintendents of the poor might select—an "alternative" provision later inserted in the three laws under which the University Hospital now receives most of its public patients, the adult-patient act of 1915 and the two general

laws for crippled and afflicted children (1881 and 1913).

The 1925 version of the poor law providing for medical aid was in most respects, however, identical with that of 1889, except that the terms "poor person" and "infirmary" were used in place of "pauper" and "poor-house." The retention of the terms "obstetrical wards" and "hospitals of the University" revealed a certain obsolescence in the statute, since for nearly twenty years there had been separate buildings for obstetrical patients and the Homeopathic Hospital had been merged with the University Hospital in 1922.

The years following the opening of the present Hospital building in 1925 witnessed significant developments in all three types of public-patient laws. The major law for the hospitalization of indigent adults (Act No. 267 of 1915) was materially altered by four amendatory acts. In 1927 Act No. 317 directed the University Hospital superintendent to send reports on persons hospitalized under the 1915 law to the probate judges and to release the counties from liability for hospitalization periods longer than six months, unless an extension order was obtained. In 1929 the boards of county auditors were made responsible by Act No. 293 for investigating the financial condition of prospective patients seeking aid under the 1915 adult-patient act and were permitted to arrange with patients to repay the counties for benefits received.

Under the earlier poor law and under certain other statutes, adults were treated in local hospitals, but those hospitalized under the adult-patient law of 1915 had to be committed to the University Hospital. This was changed in 1933 by Act No. 222, giving the probate judges the privilege of selecting other hospitals if they saw fit.

Act No. 304 of 1939 denied officials

any authority to compel a patient to undergo an operation or treatment as provided under the terms of the 1915 adult-patient law. Only with the consent of the guardian or of the nearest relative could such treatment be undertaken for patients not in condition to decide for themselves. The same held true for children.

Since physicians not at the University were permitted to charge fees, the title of Act No. 267 of 1915 was altered in the 1939 law to omit the word "free" from the phrase "to provide free hospital service and medical and surgical treatment." Stricter financial controls were also prescribed, and any falsification regarding financial need was punishable by fine or imprisonment. Also, the optional repayment agreements were made compulsory. Where there were county boards of auditors, the Department of Social Welfare might conduct financial investigations and become responsible for obtaining repayment pledges.

Upon the enactment of this 1939 law the attorney general distinguished between the hospitalized group of special patients in the amended Act No. 267 of 1915 and the group given medical aid outside of hospitals under a 1939 welfare act (No. 280).

In certain instances county costs for administering the poor law of 1925 (No. 146) might be recharged to the smaller governmental units, which the afflicted adult act of 1915 did not permit. This led the attorney general to rule in March, 1939, that supervisors might not charge back expenses incurred under the 1915 act to the townships or cities.

SPECIAL-DISEASE LAWS, 1925-40.—The Psychopathic Hospital act of 1927 (No. 207) was the first special-disease law affecting the clinical work of the Medical School after the opening of the new University Hospital. It repealed the amended law of 1907 and embodied the

changes brought about by the abolition of the several asylum boards and the creation of the State Hospital Commission and the augmented State Administrative Board in 1931. In all matters not prescribed, the trustees of the State Psychopathic Hospital retained sole control. Non-Regent members were appointed by the governor for four-year terms, whereas the four Regent members continued to be selected annually by the Regents. The new law required that medical officers of the state mental hospitals receive University instruction, at the expense of the respective institutions.

A new law for sterilization (No. 281), repealing the amended act of 1923, was passed in 1929. The largest number of cases registered under it in a year was sixty-three in 1930-31; there were none in 1939-40.

The first tuberculosis legislation affecting the University Hospital was passed in 1929, when Act No. 115 abolished the board of trustees of the Howell State Sanatorium and created the state Tuberculosis Sanatorium Commission. The commission was given control of any sanatoriums to be established and the power to transfer patients from state tuberculosis sanatoriums to the University Hospital for special treatment, with the usual costs chargeable to the counties for all indigent patients except state wards. A fund for a one-hundred-bed University Hospital addition for tubercular patients, equipped for diagnosis and special surgical treatment rather than for prolonged care, was granted in 1929 by Act No. 324.

In 1935 the legislature, by Public Act No. 173, abolished the State Psychopathic Hospital board and transferred its functions to the Board of Regents. Since the Psychopathic Hospital still remained, nominally, a semi-independent state institution and not a part of the

University Hospital, the Regents, in acting upon Psychopathic Hospital affairs, assumed that they were serving as a state board succeeding the old board of trustees (*R.P.*, 1932-36, pp. 718 and 810). This act under which rules were to be formulated by the Regents, replaced, in general, all references to the regulations of the State Administrative Board as set forth in the Psychopathic Hospital law of 1927. The governing board retained the power to provide aftertreatment, but the provision for city or community dispensaries and mental hygiene departments was omitted.

The laws concerning institutions for mental diseases, feeble-mindedness, and epilepsy were revised in 1937, when, under Act No. 104, the State Hospital Commission within the State Welfare Department was replaced by a new, separate commission of the same name. Also, Acts No. 85 and 243 providing for the new five-story Neuropsychiatric Institute addition to the University Hospital, superseded and repealed the Psychopathic Hospital act of 1927 and abolished the State Psychopathic Hospital as an organization, but stipulated that the Regents should keep the property (see Part II: THE NEUROPSYCHIATRIC INSTITUTE AND THE STATE PSYCHOPATHIC HOSPITAL).

The main purposes of the Institute as outlined are: (1) to emphasize early diagnosis and treatment, (2) to establish a clinic for study of the prevention of mental illness, and (3) to conduct training and research in all phases of mental disease. The Institute, as part of the University Hospital, is controlled by the Regents. It does, however, receive state aid. In the three years ending June 30, 1940, this annual grant averaged about \$105,000.

The provision that the medical director of the Psychopathic Hospital was also to be ex officio neuropathologist of all

the state mental hospitals was discontinued by Act No. 85, as were the regulations regarding the visits by the outstate hospital staff members to the neuropathological laboratory at Ann Arbor. It also provided that all patients in the old Psychopathic Hospital should either be discharged as normal or declared insane, feeble-minded, or epileptic and committed to a suitable institution. State hospital patients might be transferred to the new Institute for treatment or for purposes of research, at the expense of the Institute. The law also permitted the temporary referral to the Institute of all persons suspected of mental disorder. Though not definitely committed, their detention periods could be extended to provide time to determine whether commitment to a state hospital was desirable.

While the only voluntary patients in the old Psychopathic Hospital were private patients, under the regulations of the Institute an indigent person might apply for admission under a private court order. The Institute was also organized to make special provision for the care of children. Up to June, 1940, patients were received under several different laws. Thus, transfer patients were admitted under Act No. 85 of 1937; adults came under Act No. 267 of 1915; and children entered under Act No. 138 of 1881, as well as under the two general laws for afflicted children, Act No. 174 of 1913 and Act No. 283 of 1939, and also under the crippled children's law, Act No. 158 of 1937.

CHILDREN'S HOSPITALIZATION LAWS, 1925-40.—More than half the laws affecting the University Hospital passed between 1925 and 1940 concerned children, and the changes were far-reaching. After Act No. 236 created the Michigan Crippled Children Commission in 1927, any crippled child could be treated either at the University Hospital or at any

other hospital having an orthopedic surgeon, the commission to approve both surgeons and hospitals. Surgeons' fees in all hospitals except the University Hospital as well as transportation and hospital expenses were to be paid by the state. The commission was to locate as many as possible of the state's crippled children and report what was being done for them. It was to conduct diagnostic clinics and, in general, to secure the best possible surgical and medical treatment for the children, as well as to take charge of their convalescent care and education. By a further act (No. 317), in 1929, the commission was given the additional responsibility of follow-up supervision.

In the same session in which the Crippled Children's Act was passed, Act No. 274 of 1913, known since 1927 as the Afflicted Children's Act, was amended to provide for the treatment of obstetrical cases.

Although the 1927 Crippled Children's Act was supposed to end hospitalization of crippled children as provided under the old 1913 law, there is evidence that the law was sometimes used for the local hospitalization of "afflicted" but not crippled children. In fact, many probate judges continued to send crippled children to the University Hospital under the 1913 act.

In 1926-27, 2,614 patients were registered in the University Hospital under the children's act of 1913; the following year there were 2,760, and in 1928-29, 3,356. Apparently, no statistics are available on the corresponding numbers of patients registered under the Crippled Children's Act of 1927 until 1929-30, when there were fifty-three children under the Crippled Children's Act as against 4,244 under the Afflicted Children's Act, with seventeen children registered from state institutions under the amended Act No. 138 of 1881.

In June, 1931, the Crippled Children

Commission obtained authority to pass upon hospital bills incurred under the Crippled Children's Act, but since the hospitals and courts were not obliged to report on children committed under the Afflicted Children's Act, it still had no way of estimating the total hospitalization of crippled children. Two years later an amendatory act (No. 248) sought to improve the situation, but conflicting provisions made the law difficult to administer. It introduced the use of local hospitals for "afflicted" children, gave the Crippled Children Commission charge of the administration of the Afflicted Children's Act, and forced a sharper separation of "crippled" and "afflicted" cases by making it illegal to hospitalize a crippled child under the Afflicted Children's Act.

Since under the adult acts only patients more than twenty-one years old were entitled to aid and under Act No. 248 of 1933 only persons under eighteen could be treated under the Afflicted Children's Act, there was no legal way to hospitalize "afflicted" persons between seventeen and twenty-one years of age. Act No. 5 of 1934 removed this difficulty.

Contradictory provisions in Act No. 248 regarding fee schedules and modes of payment as between the counties and state brought some confusion. The first difficulty was temporarily solved by the adoption of a satisfactory fee schedule. The commission also decided in 1933 to approve no hospital bills under the Afflicted Children's Act except those for fifteen-day treatment periods for which advance permission had been obtained, thus preventing state payment for children not hospitalized under proper probate court orders.

Hurley Hospital at Flint, Fairmount Hospital at Kalamazoo, and the Northern Michigan Children's Clinic at Marquette had been regarded as "branches"

of the University Hospital, but when Act No. 248 went into effect the two former hospitals were made approved hospitals for afflicted children, the Marquette clinic remaining as a branch of the University Hospital.

In a 1935 ruling the commission provided reimbursement to the state by the counties for expenses incurred in cases of children suffering from adult types of tuberculosis, venereal diseases, or other communicable diseases and committed to hospitals under the Afflicted Children's Act. This became law in 1939.

The sweeping change of policy involved in Act No. 248 of 1933 caught most local officials unaware, and thousands of court orders under the old children's law of 1913 had to be returned for correction. But despite flaws, mostly corrected later, the act had a more pronounced effect on the over-all administration of children's hospital relief than did the special legislation and establishment of the Crippled Children Commission in 1927. The University, in June, 1933, was the only institution approved under the Afflicted Children's Act. A year later, in 1933-34, there were more than one hundred approved institutions with a resultant decrease in the University Hospital of nearly twelve hundred patients committed under the Afflicted Children's Act. Registrations under the Crippled Children's Act rose from 190 to 1,049, and the commission reported that the University Hospital increase accounted for more than three-fourths of the year's increase in cases for all hospitals under the Crippled Children's Act.

As a result of continuing dissatisfaction with the allocation of fees between state and counties, the old children's law of 1913 was once more amended. In 1935 Act No. 94 made transportation expenses of afflicted children rechargeable to the counties, but left treatment fees

payable by the state. But then a new difficulty arose; the state appropriation for children's medical care was not adequate to cover physicians' fees. The commission estimated in 1936 that about one million dollars should have been added to the fund to cover these fees. The physicians, however, agreed to accept a nominal fee of one dollar a case during the 1934-36 biennium, and within a year a more liberal schedule was tentatively adopted.

The Afflicted Children's Act was further amended in 1935 by Act No. 208, which required that before a child could be hospitalized an agreement to reimburse the state for expenses was necessary between the auditor-general and the child's parents or guardian. Within two years such repayments rose from \$841.92 to \$11,723.88.

Three amendatory statutes in 1935 also changed the Crippled Children's Act of 1927. One (No. 169) shifted transportation costs to the counties, directed hospitals to report on the admittance and discharge of patients, and specified that no person should be considered a recipient of pauper aid because of inability to pay for a child's treatment. Another act (No. 182) prescribed that all collections from parents and school districts, as well as gifts to the commission, should be deposited to the commission's credit in the state's general fund. A third (No. 207) made repayment pledges by parents or guardians mandatory and fixed the amount per day payable by the state and local school districts for hospital schools. In 1937 these amendments were consolidated in Act No. 158, which replaced Act No. 236 of 1927.

This new law included the needed definition of "crippled child" and gave the commission additional responsibility, financial backing, and greater authority to enforce its decisions. It became responsible for handling each case com-

mitted by a probate judge. Collections, legislative appropriations, and gifts were to be held, as before, distinct from other state funds, but the new law omitted the provision that such funds be disbursed "as appropriated by the legislature." The commission and the auditor-general had the right to check all disbursements.

The new law emphasized preventive measures. Aid to children suffering from conditions that lead to crippling was authorized, and facilities for finding and serving such children, and those already crippled, especially in rural areas, were improved. In addition to diagnostic clinics, an expanded outstate service provided preventive treatment, minor orthopedic operations, follow-up supervision, and outpatient and convalescent service. In special cases transportation to clinics and treatment centers was furnished.

The commission was authorized to approve homes or hospital outpatient departments where adequate care and prevocational training could be provided those crippled children who would benefit very little from treatment. Rates for medical and hospital service were fixed for the first time: \$4.50 a day for hospital service, doctors' fees at \$75 for a major operation, and \$200 for any one patient in a single year. One-half the costs of custodial cases was to be recharged to the counties; local school districts continued to furnish some support for the hospital schools, but under the new Crippled Children's Act all other expenses were paid by the state.

The desired definition of "afflicted

child" was furnished by Act No. 217 of 1937, which also effected certain other changes in the Afflicted Children's Act, but two years later the old much-amended children's act of 1913 was replaced by Act No. 283. It extended the commission's jurisdiction in "afflicted" cases, established further financial controls, and systematized provisions added to the old act by the various amendments. It also limited the state's liability, allocating to the counties according to population three-fourths of the fund available each year, with the remaining one-fourth to be distributed according to need. The rate at which counties could consume their quota was also limited, and they were not allowed to reimburse themselves from later allotments. The commission was thus relieved from approving more services than could be paid for from available funds, and the state from the necessity of making supplementary appropriations.

In 1932-33, the year before the local hospitals were permitted to receive afflicted children under Act No. 274 of 1913, the number of patients in the University Hospital under the Afflicted Children's Act was nearly twice the number under the Afflicted Adult Act of 1915. By 1935-36 more patients were registered under the adult act of 1915 (No. 267) than under all three children's laws. In 1939-40, by far the greatest number of patients received under any one law was registered under the Afflicted Adult Act of 1915.

HELEN TRAVIS

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THE HEART STATION

During the period when Dr. A. W. Hewlett held the chair of medicine at the University (1908-16) there was widespread interest in the irregularities and other abnormalities of the heartbeat, and knowledge in this field was expanding very rapidly. Dr. Hewlett himself had made important contributions to this subject, and Dr. J. G. Van Zwaluwenburg was also deeply interested in it. As soon as the necessary funds could be obtained Dr. Hewlett purchased a string galvanometer, and electrocardiograms were taken for the first time at the University Hospital in the spring of 1914.

Dr. Frank N. Wilson, who was appointed Assistant in the Department of Internal Medicine upon his graduation with the class of 1913, was assigned the task of installing and operating this instrument. Since no other space was available it was placed in Dr. Hewlett's private office, a small room separated by a thin wooden partition extending half way to the ceiling from the general office of the department, which was on the second floor of the Medical Wing of the Old University Hospital. The electrocardiographic tracings were carried downstairs, where a tiny darkroom was available for their development. In spite of these meager and inconvenient facilities, many interesting observations were made and a number of papers were published. With Dr. Hewlett's help arrangements were made for recording the venous pulse, taken with a Frank capsule, simultaneously with the electrocardiogram, and this added greatly to the value of the tracings. One of the most important studies carried out dealt with the production of atrioventricular rhythm in normal subjects after the administration of atropin.

In 1916 both Dr. Hewlett and Dr. Wilson left Michigan and during the next four years relatively few tracings were

taken. When Dr. Wilson returned to Ann Arbor in 1920 the equipment had been removed from its old location. It was not in good working order, and there was no available space where it could be installed. Nothing further was done until 1922 when Dr. George Herrmann, a Michigan graduate, joined the staff. At that time, with the help of Dean Vaughan, a special appropriation was obtained which made it possible to purchase new equipment and to construct a small laboratory where it could be set up. This laboratory included a small passageway and some space beneath the stairs leading to the medical amphitheater. As a result many of the waves on the tracings obtained were produced, not by the patient's heartbeat, but by the students rushing to and from their classes. In the early summer of 1922, when this new laboratory was completed, Sir Thomas Lewis of London visited the University, and this visit did a great deal to stimulate interest in electrocardiography.

In order to defray the expense of operating the new laboratory, the Hospital made a charge for each clinical electrocardiogram taken. A technician, Miss Evelyn Turner, was secured, and she soon became expert at operating the galvanometer. During the next three years about 4,500 electrocardiograms were taken and several research projects were carried out, among which may be mentioned Dr. Herrmann's studies on ventricular hypertrophy.

When the new University Hospital was under construction, arrangements were made for a wiring system whereby it became possible to take an electrocardiogram on any patient in the Hospital without making it necessary for the patient to leave his bed. In 1924 Professor Willem Einthoven visited Ann Arbor, and negotiations were begun with him at that time for the construction in Holland

of a new galvanometer which would make it possible to take two electrocardiographic leads simultaneously. After much delay this galvanometer, which was actually constructed in Eindhoven's laboratory, was obtained in the summer of 1927. It proved to be a wonderfully fine piece of apparatus, and much of the research work carried out in the Heart Station since that time could not have been done without it.

The Heart Station was moved to the new Hospital in the autumn of 1925. Dr. Herrmann was succeeded by Dr. Paul S. Barker. The additional help, space, and equipment made it possible not only to serve the Hospital more adequately, but also to do research which has been of the

utmost importance. Studies of the distribution of the electrical currents produced by the heartbeat within the body, of the electrocardiograms produced by human bundle branch block, of precordial leads, of the areas of the electrocardiographic deflections, and of experimental and clinical coronary occlusion may be mentioned.

In 1932 Dr. Franklin D. Johnston joined the staff. He not only has taken an active part in many of the studies already mentioned, but also has done a great deal of work on the registration of heart sounds and on the adaptation of the cathode-ray oscillograph to the study of the electrocardiogram.

FRANK N. WILSON

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THE TUBERCULOSIS UNIT

On January 25, 1926, under the direction of Dr. George Sherman, a fifty-bed unit was opened on the second floor of the Convalescent Hospital for the medical treatment of tuberculosis. This was the first time in the history of the University Hospital that separate beds had been set aside for this specific purpose, although in 1902 George Dock, who was then Professor of Medicine, had written an article urging that a special hospital for this purpose be constructed. While this arrangement served its purpose well as a beginning, it was soon appreciated that the space for beds, offices, X-ray facilities, and laboratories, was inadequate. In order to remedy this situation the legis-

lature of Michigan appropriated \$250,000 to add two floors to the University Hospital for the care of patients with pulmonary tuberculosis. They were first occupied by patients on July 21, 1931. Accommodations are provided for ninety-eight patients in six single rooms, ten two-bed rooms, and eighteen four-bed rooms. There are ample workrooms for examinations, treatments, laboratory examinations, including fluoroscopy, and a room for the demonstration of patients and X rays to students.

The unit is a part of the University Hospital and Medical School. A medical staff is maintained by the Department of Internal Medicine, through which are rotated all of the instructors and interns.

Dr. John B. Barnwell has headed the medical staff since 1928. In this way the Hospital is sending out into practice in the state of Michigan, year after year, physicians who are especially trained in all of the modern phases of the treatment of tuberculosis. The Department of Surgery maintains a division of chest surgery under the leadership of Dr. John Alexander, who is directly responsible for the tuberculosis patients who are admitted

primarily for surgical measures.

Instruction of medical students in regard to tuberculosis is carried out in the last three years of their course. In the second year, one or more groups are giving instruction in physical diagnosis. In the third year, groups may elect work in tuberculosis. All fourth-year students pass through the unit in small groups for discussion of diagnosis and treatment.

CYRUS C. STURGIS

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SOCIAL SERVICE DEPARTMENT

The Social Service Department of the University Hospital began with the passage of the Michigan Medical Care Acts, the first of which (Act No. 274), passed by the legislature in 1913, permitted judges of probate to send to the University Hospital children suffering from congenital defects or diseased conditions. Shortly afterward, a similar measure (Act No. 267) authorizing the care and hospitalization of adults, was passed by the legislature. These acts determined in large part the designation, number, and type of patients received for clinical teaching purposes. They came particularly from indigent or marginal groups for which such care was otherwise not available: children who were wards of the state, congenital cripples, psychopathic cases needing medical care or surgical treatment, children with curable maladies or deformities whose parents were unable to provide proper treatment, crippled children, sterilization cases, and tuberculosis cases.

These measures brought many new

patients needing special services to the hospital. Efforts to provide some sort of social service for hospital patients had, as a matter of fact, begun almost with the opening of the old University Hospital. The University Hospital Circle of the King's Daughters was formed in 1892 to give assistance to patients. These efforts, however, were voluntary and not always continuous. Within the Hospital, moreover, the nurses' service in 1912 had designated a particular nurse to act as a part-time social worker.

Mary C. Merriweather was Supervisor of Social Service in 1918 and Imogene Poole in the years 1919-21. Offices were assigned the Social Service Department in 1919, and in 1920 Dr. Christopher Parnall, then Director of the Hospital, reported that the Rotary Clubs were interested in maintaining in the Hospital a social service worker who would care particularly for the welfare of children sent to the Hospital under Public Act 274. In 1921 Mrs. Elmie W. Mallory (Ph.B. Buchtel '97, A.M. Michigan '20) was made Supervisor of Social Service in the Homeopathic Hospital. When the

University Hospital and the Homeopathic Hospital were combined in 1922, Miss Dorothy Ketcham was appointed Social Service Director to integrate the Social Service Division of the University Hospital. Mrs. Mallory became Director of Social Service in the State Psychopathic Hospital.

In his report for 1920-21, Dr. Parnall said: "The role of a University Hospital in a broad program of education is to teach people the means of protecting and restoring health and preventing disease, both directly and through those who by their preparation and calling are fitted to serve in this field." With a social service program thus recognized, the first few years were spent in defining objectives, in improving methods so as to increase the satisfaction of the patients, in selecting personnel, and in establishing an improved system of records.

THE HOSPITAL SCHOOL.—Among the important objectives of the service was the Hospital School. The King's Daughters of Ann Arbor supported the first teacher and have continued to help the program. Through the Michigan Crippled Children Commission the state also made funds available for the instruction of crippled children. New activities directed toward constructive programs were introduced in 1918 by Claudia Wanamaker. Since 1925 the Ann Arbor Kiwanis Club has given financial support to the program. In 1928 Galens, a senior medical society, undertook the support of a hospital workshop. The hospitalized child has been able to continue his schooling in this way, advancing with others of his age and in some cases graduating from school at the proper time. Although state funds make no provision for teaching preschool children, who at times make up almost half the total enrollment, a definite program has been set up for them as funds have become available.

OCCUPATIONAL THERAPY.—At first, occupational therapy for adults was carried on through voluntary service. Miss Helen James was appointed in July, 1920, to take charge of social work among dermatological cases being treated by Dr. Udo J. Wile. The work was financed through the Michigan Department of Health. Miss James introduced basketry, sewing, and similar activities, and an early exhibit revealed the value of such employment.

The facilities for occupational therapy include a large central shop and supplementary ward units. Some work can be carried to the patient's bedside. The central shop, largely equipped through the Galens' support, is a large, pleasant room for wheelchair or bed patients. The shop is equipped with looms, sewing machines, a jigsaw, carpenter's benches and tools, leather and reed tools, rug frames, a knitting machine, hoops, hooks, needles, as well as art and craft magazines and instruction books. It is open all day and has an average attendance of one hundred. The type of work varies according to the patient's individual interests and the length of his stay in the hospital. Some accept the idea of occupation eagerly and engage in comparatively vigorous activity; others require a limited or graduated program.

An important part of the social program is the library service. In 1935 a regular library service was set up on a full-time basis, and books were distributed on schedule. This service covers every unit in the Hospital. Reading lists are provided, and awards in the form of reading certificates are made on the basis of achievement.

Social service in the Hospital grew up as a result of case work with the individual patient. The work concerns itself particularly with the patient and with his reinstatement, if possible, as an effective member of society. The program

in the University Hospital has adhered closely to lines laid down by the American Association of Medical Social Workers, the American Hospital Association, and the American College of Surgeons. As standards for personnel have improved new methods have been adopted for handling the work of the department. These improvements include a system of case recording, staff and group discus-

sions, statistical sheets developed for the use of the case workers and the consultant, plans for better student instruction, and better and more accurate medical data. A further function of social service has been the matter of follow-up, which often concerns physician, judge, patient, and family.

DOROTHY KETCHAM

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METABOLISM RESEARCH

The first deliberate attempt by a member of the Department of Internal Medicine to advance the knowledge of metabolic processes in patients was begun by Dr. L. H. Newburgh when he came to the University as an Assistant Professor in the fall of 1916. He suspected that the kidneys could be impaired by food very rich in protein. The first experiments were carried out in the Hygienic Labora-

tory because the department was without an experimental laboratory in the University Hospital. Shortly thereafter, the old laundry behind the hospital was renovated and in part given over to the members of the department for their investigations. Dr. Newburgh was assisted in the study of nephritis produced by diets rich in protein and its products by Dr. Theodore L. Squier, Dr. Phil L. Marsh, Dr. Arthur C. Curtis, and Miss

Sarah Clarkson (d. 1931). More recently the work has been conducted by Dr. Margaret W. Johnston; and Dr. Richard H. Freyberg has been concerned with the question of the recoverability from the injury produced by the diets.

As late as 1918, the treatment of diabetes mellitus was still very unsatisfactory. Dr. Newburgh and Dr. Marsh began at that time to try to improve the dietary control of the disease, and by 1922 they were able to report that the disease could be adequately controlled in most adult patients by the plan they had developed. Dr. Floyd H. Lashmet and Dr. Newburgh undertook a study of the edema that occurs with one form of chronic nephritis. They were able to work out a plan that usually succeeds in eliminating the edema and preventing its recurrence.

Obesity is one of the most important causes of chronic illness in middle life. Earlier students had thought that the condition was often hereditary and unavoidable. This conception seemed highly unlikely. In order to study the question adequately, methods for meas-

uring the exchange of energy and of water first had to be devised. Dr. Frank H. Wiley was of the greatest help in developing these two techniques. Dr. Newburgh and Dr. Margaret Johnston, using these new methods, then demonstrated that obesity is always caused by an inflow of energy greater than the outflow and that it can always be overcome by appropriate dietary methods.

Dr. Newburgh, Dr. Johnston, Dr. Jerome Conn, Dr. Florence White, and Dr. Elisabeth B. Stern engaged in an elaborate investigation of the normal and abnormal metabolism of carbohydrate. Dr. Coral A. Lilly for some years investigated the nature of dental caries as related to diet.

Since the opening of the University Hospital the group has had adequate laboratory space and a sufficient appropriation for current supplies. Salaries for fellow workers have always had to be obtained from sources outside of the regular budget. The work has been seriously hampered by inadequate financial support.

L. H. NEWBURGH

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UNIVERSITY HOSPITAL PHARMACY

During the years (1869-90) forming the initial period in the history of the University Hospital, there was no obvious need for a separate pharmaceutical service.

In 1892, when the University Hospital was moved to new quarters on Catherine Street, the rules and regulations adopted for the conduct of the newly created post of Apothecary were as follows:

The Apothecary shall be subordinate and responsible to the Resident Physician. He shall have the immediate care and custody

of all drugs, medicines and other articles belonging to the department and be responsible for the same. He shall compound and make up all medicines which may be prescribed with exactness and promptitude. He shall deliver no medicines or other articles unless the same shall be duly entered upon the prescription or order books, or ordered in writing. He shall put up the medicines intended for each ward separately and shall annex to them labels containing the names of the patients for whom they are respectively prescribed, with written or printed directions for their use. He shall deliver them promptly to the nurses of each ward to be by them ad-

ministered to the patients. He shall be responsible for the correct preparation of all prescriptions. He shall have charge of all the instruments belonging to the Hospital and shall be responsible for them and their good order. He shall keep an account of them and shall never allow them to leave his possession without taking a proper receipt or ticket from the person so taking them. He shall make an inventory of all instruments belonging to the hospital, when he enters upon his duties; and, on giving up his charge, he shall furnish the Superintendent a like inventory countersigned by the Resident Physician. He shall keep the dispensary and everything pertaining to it clean and in perfect order, and the same shall remain open from 8:30 a.m. to 8:00 p.m., in his charge. He shall observe economy in everything relating to his department, be particularly careful in the preparation and delivery of medicines, and permit no noise, confusion or disorder in his premises. (*R.P.*, 1886-91, p. 535.)

Having thus outlined his duties, the Regents authorized that an apothecary be appointed in the University Hospital for one year at a salary of \$200. In carrying out the intent of the Regents the executive committee appointed James Perry Briggs ('91p) to the position.

Mr. Briggs's duties covered a very wide field. He prepared all the sutures used in the operating rooms, and, after the initial pictures taken by Carhart and Herdman, he was assigned the task of taking the first X rays used here, continuing all work of this nature until the Department of Roentgenology was established.

Mr. Briggs's association with the institution cannot be passed without mention of his wide acquaintanceship, especially in the "old Hospital," and his kindness to those with whom he worked. He was particularly happy to help the nurses. He removed stains from uniforms or best dresses and provided remedies for headache, a cold, or a cold sore. His "favorite prescriptions" were never disclosed, and

no record of them has ever been found.

A bronze tablet now placed at the location of the present Hospital Pharmacy befittingly states: "In Memory of James Perry Briggs, Ph.C., Pharmacist to the University Hospital, 1891-1927. Universally Respected and Beloved by Those Connected with This Hospital During His Long and Faithful Term of Service."

Mention of Perry Briggs, despite the fact that a written record of the Hospital Pharmacy is his biography, would be quite incomplete without coincident mention of "Pat Scully." The bronze tablet opposite that of Mr. Briggs tells its story. This continuing association of these two names is very satisfying to their friends: "In Memory of Patrick Henry Scully Who Devotedly Served This Hospital In Many Capacities For More Than Half A Century. 1875-1929."

In 1920 Amos Ludwig Kroupa (Ph.C. '22) became Assistant to the Pharmacist. He retained this post until 1936, when he accepted an appointment as Chief Pharmacist at the Evangelical Deaconess Hospital at Evansville, Indiana.

In 1925 Harvey A. K. Whitney (Ph.C. '23) joined the staff, and he became Chief Pharmacist upon the death of Mr. Briggs in 1927.

The department has gradually grown in range of activities and in personnel. During a changing materia medica the Hospital Pharmacy has been allowed to engage in many manufacturing activities that were previously prohibited. The staff in 1940 consisted of eleven registered graduate pharmacists and five unlicensed assistants. The products of the department are obtained from the three kingdoms and are prepared to be administered by all natural bodily orifices, as well as some man-made, as when access is to the circulatory system.

One interesting development in the growth of the department has been the

establishment of a pharmacy internship plan, adapted from present medical practices. Six pharmacy interns are quartered with the medical interns and enjoy the same privileges. The plan calls for the selection of a candidate from among the recent graduates of one of the

member schools of the American Association of Colleges of Pharmacy. Such an applicant when accepted receives an appointment as junior grade pharmacist for one year. He may be reappointed for a second year as senior grade pharmacist.

H. A. K. WHITNEY

HOSPITAL RECORDS AND STATISTICS

The very first record available on any patient in the University Hospital is dated October 5, 1881. This is Case No. 1, which is listed in a leatherbound book and is the first of a series of records maintained by the Department of Gynecology, at that time under the direction of Dr. Edward Dunster. This book is entitled "Gynecological Clinic Record, Medical Department" and contains the records on patients seen in that department from October 5, 1881, to December 5, 1882.

The history sheets in this record book were outlined forms calling for routine statistical information about the patient, such as age, marital status, number of children, age of oldest, and age of youngest. Ten lines were reserved for enumeration of the symptoms and three lines for the physical examination. Space was also left for a rather detailed gynecological history. At the bottom of the sheet was a space for diagnosis. Opposite this page was a ruled sheet for recording treatment.

The diagnosis noted on this first patient was menorrhagia, and on the treatment sheet under date of October 26 is a note, "No abnormal condition of the interior of the womb. Mucous lining removed with curette." Under date of November 8 appears another note—"Uterine mucous lining again removed." Patient No. 3 was diagnosed "vesicovaginal fistula traumatic." On the treatment sheet under date of October 28 is

noted: "Fistula closed; eight sutures (silver) (one horse hair)"; November 4: "Stitches removed; operation incomplete due to neglect after operation (anesthesia, ether). Patient left Hospital." January 17: "Returned; second operation successful. Patient dismissed." These examples are typical of the extent to which examinations were written up and operations described at that time.

Record systems were apparently established about the same time in other departments, each one maintaining its own separate case number for the patient and retaining in the department all available information learned.

It was interesting to find a sheet in this original book entitled "Examination of the Urine." This contained statements as to the physical characteristics including reaction, color, and specific gravity. After this, was chemical examination, which called for urea, phosphates, bile, albumen, urates, and sugar. The microscopical examination called for crystals, anatomical elements, casts, and, finally, other morphological elements. At the end were reserved a few lines for pathological indications.

It is difficult to determine just when indexing of diagnoses was actually begun; however, shortly after the history forms were established, these various clinical departments formulated their own individual systems of recording diagnoses and operations. No uniform system was used, some preferring to list the diagnoses alphabetically, and some

by numbers. Operations were recorded in a similar manner.

Shortly after the University Hospital was opened in 1925, Dr. Harley A. Haynes, the Director, obtained the services of Miss Florence G. Babcock, at that time record librarian of the Peter Bent Brigham Hospital in Boston, who assumed charge as Record Librarian. At the same time the various departments were persuaded to submit all information pertaining to a given patient to a central record room, where it could be included in a unit patient record. In addition to including the various examinations made by different departments on any one patient, the record thenceforth was to include all X-ray reports, pathology reports, bacteriology reports, and other special laboratory procedures. On admission to the Hospital, each patient was to be given a registration number, and this was to be employed uniformly by all the departments in which the patient was seen. Coincident with the formation of the unit system, the Hospital staff adopted the Massachusetts General Nomenclature of Disease as the standard nomenclature to be used in the Hospital.

The staff doctors were then requested to list the various diagnoses and operations on the front sheet of each patient's unit-record, and these in turn were recorded on special cards in the central record room by trained record librarians. For reference purposes the diagnosis, secondary diagnosis, name, operated or not operated, registration numbers, service, sex, age, registration date, date of death, date of previous registration, and classification were recorded.

With this new system it became possible for the doctors to obtain for study all cases of any one diagnosis seen in the University Hospital, regardless of who made the diagnosis. In addition, all information pertaining to a patient could be obtained in one record.

In 1933 the executive staff of the Hospital entertained the advisability of establishing a large cancer clinic. In the course of developing this clinic various methods of recording routine statistical information were studied, and the so-called Hollerith punch card system was adopted. Dr. H. M. Pollard, at that time Instructor in the Department of Internal Medicine, was appointed to take charge of establishing this unit for hospital statistics. He was succeeded July 1, 1937, by Dr. Isadore Lampe, Instructor in the Department of Roentgenology.

Space was made available for this new unit on the ground floor of the University Hospital, and adequate tabulation machinery was obtained. From July 1, 1934, all routine statistical information relating to patients, and all their diagnoses and operations, have been recorded on punch cards. This includes the patient's registration number, age, race, status, classification, service, residence, all diagnoses and operations, Kahn report, death, autopsy, X-ray report, pathology report, and condition on discharge.

The nomenclature employed beginning July 1, 1934, was still the Massachusetts General System, but diagnoses were given numbers which could be utilized in the punch card system, and in so doing, space was made available for the addition of new diagnoses.

A doctors' study room was built in connection with the Statistical Unit and furnished with comfortable chairs convenient for studying records. All doctors studying cases utilize this room, so that records are not distributed to various offices.

This whole method of tabulation for hospital records is proving highly satisfactory and serves as a great stimulus to the staff physicians making careful and accurate statistical analysis of various diseases, forms of treatment, and results.

The records themselves have been improved by typing all inpatient histories and physical examinations. Outpatient notes are still made in longhand; case summaries, and in some instances progress notes, are typed. An effort is made

to have all statements relating to types and results of treatment as specific as possible so that the information may be made available for study at any future date.

H. M. POLLARD

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THE SCHOOL OF NURSING

THERE is no reference to nurses in the official records of the first campus Hospital of 1869. When the Hospital was enlarged in 1876, it was recommended that two nurses be employed, "one male and one female," though the position was still apparently such a menial one that nurses are not mentioned by name in the Regents' *Proceedings* until 1881, when Dr. E. O. Bennett put in a claim for \$130 for thirteen weeks' nursing services during the summer of 1880. The following year two young doctors and one woman were appointed at a salary of \$300 each. In 1883 the position of wardmaster was recorded in the Regents' *Proceedings*; it was abolished in 1891. Apropos of this unusual title, the late Dr. W. J. Mayo wrote to Dr. Peterson in 1937:

In my student days . . . there were comparatively few nurses, in the modern sense, and a good deal of the work was done by practical nurses, the students, and helpers generally. There was attached to each ward, a wardmaster and wardmistress who were responsible for the care of the patients, and gave the students their orders. (Peterson, MS, II: 115.)

After 1891 there was a steady growth in the number of nurses; by 1896 there were sixteen. This was probably the re-

sult of the authorization in 1891 of a training school for nurses and of a two years' nursing course.

The enrollment in the first year of the School was eight. Seven were graduated in December, 1893. Mrs. Jane Pettigrew, a trained nurse then pursuing medical studies in the University, directed the training. The next year President James B. Angell observed that the course was "attracting a large number of intelligent and devoted women, who render a service to the sick, hardly inferior to that of the physician."

Graduates of the School, a head clinic nurse and two head nurses, were permanently employed by the Hospital for the first time in 1899. It is also worthy of note that graduates of the School served in the Spanish American War. By 1900 the School had developed a sufficient sense of solidarity to organize an alumnae association, with eighteen charter members. By the year 1924-25, 190 nurses were in training. The administrative nursing staff included, in addition to a matron and a dietitian, a principal of the training school, a superintendent and an assistant superintendent, a director of the Hospital education department, and two instructors.

This rapid increase in the nursing staff

necessitated successive adjustments in the living quarters provided for nurses, which in the early years were inadequate. At first the nurses were quartered in the basement of the Hospital and in adjacent houses, but the completion both of the Nurses' Home in 1898 and of Palmer Ward in 1903, for a time provided some relief. The continual increase in the number of children admitted to Palmer Ward, however, necessitated the removal of the nurses housed in the upper floors of that building to private houses near the campus. Six such houses were taken over by the University for the nurses after the year 1909. The erection of the Pemberton-Welsh Nurses' Residence in 1921 provided space for seventy-five more nurses. This method of housing a continually growing staff became increasingly unsatisfactory. Couzens Hall,

erected in 1925, with 285 separate sleeping rooms, finally provided adequately for both nursing staff and student nurses.

At the time the new Hospital was opened, the program of teaching in the Training School for Nurses was reorganized. The instruction in basic sciences was given by regularly appointed members of the faculties, the instruction in practical medical work by the professors in the Medical School, and the instruction in therapy and practical nursing suggestions by the nursing staff. A reorganization five years later provided for one semester's work on the University campus. In 1940 there were 177 students in the School of Nursing and 198 graduate nurses on the Hospital staff. There were also, on the average, 146 enrolled in the courses in public health nursing.

WILFRED B. SHAW

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THE THOMAS HENRY SIMPSON MEMORIAL INSTITUTE FOR MEDICAL RESEARCH

THE Simpson Memorial Institute was presented to the University of Michigan by Mrs. Christine McDonald Simpson, of Detroit, as a memorial to her husband, Thomas Henry Simpson, who died of pernicious anemia in 1923. Mr. Simpson was born in McConnelville, Ohio, and as a young man entered the business of manufacturing malleable iron in Detroit, in which city he resided until his death. After the death of her husband, Mrs. Simpson decided to erect and endow an institution for the study and care of patients with

pernicious anemia and to present this to the University of Michigan.

Mrs. Simpson offered \$150,000 for a building and \$250,000 as an endowment. It was stipulated that the activities of the Institute should be devoted, primarily, "to the study of pernicious anemia, the alleviation of the suffering of persons afflicted with that disease, and the discovery of a cure for the same." The offer was promptly accepted by the Regents.

Albert Kahn, the architect selected by Mrs. Simpson, completed the plans by

May 22, 1925, and on May 28 the contract was let to the firm of Henry L. Vanderhorst, of Kalamazoo, Michigan. Ground was broken for the building by Mrs. Simpson on June 3, 1925, and thereafter construction progressed at a rapid rate.

By January, 1926, the Institute building was nearing completion, and as the Board of Regents was not yet ready to select a permanent director and staff, on June 21 it appointed Dr. James D. Bruce, who then occupied the position of Director of the Department of Internal Medicine, as Acting Director of the Institute. At the same time a permanent advisory committee was appointed, to confer and advise concerning the research work of the organization. The personnel of this committee was as follows: Dr. Hugh Cabot, Dean of the Medical School; Dr. James D. Bruce, Director of the Department of Internal Medicine; Dr. Aldred S. Warthin, Professor of Pathology; Dr. Frederick G. Novy, Professor of Bacteriology; Dr. Howard B. Lewis, Professor of Physiological Chemistry; and Dr. Preston M. Hickey, Professor of Roentgenology.

By June 29, 1926, the building was completed. The committee of the faculty appointed Cyrus Cressey Sturgis (Washington '13, M.D. Johns Hopkins '17) as Director on January 6, 1927. He reported for duty on July 15 of the same year. Raphael Isaacs (Cincinnati '11, A.M. *ibid.* '12, M.D. *ibid.* '18), of Harvard University, was appointed Assistant Director and also Assistant Professor of Medicine in the Medical School, in February, 1927, and was asked to report for duty on April 1.

Dr. Isaacs, a native of Cincinnati, was thirty-five years of age at the time of his appointment. He had had a broad training in the field of hematology and was already well known for his contributions to the literature bearing on the subject. He had taught various subjects, including

anatomy, physiology, medicine, and clinical pathology. He had served as intern, resident physician, and chief resident physician at the Cincinnati General Hospital; then, after one year as instructor in medicine at the University of Cincinnati, and another as voluntary graduate assistant in medicine at the Peter Bent Brigham Hospital, Boston, he had been appointed instructor in medicine and assistant physician at the Collis P. Huntington Memorial Hospital of Harvard University. During his last year in Boston, 1926-27, he was consulting hematologist at the Beth Israel Hospital and assistant physician at the Boston Dispensary. He entered the Department of Internal Medicine as Assistant Professor in 1927, and was promoted to an associate professorship in 1930.

Dr. Isaacs was the first member of the staff to arrive in Ann Arbor. Much of the credit for the efficiency of the Institute rightfully belongs to his skill and judgment in formulating the early plans for its organization.

In the first thirteen years of the Institute's existence, approximately one thousand patients with pernicious anemia were seen, as well as many patients with other types of anemia. A large majority of these patients were observed over a period of one to thirteen years, and an excellent opportunity was afforded to appraise the effects of various types of treatment. In 1929 the investigators at the Institute introduced a new and effective form of treatment for the disease, which is derived from hog stomach (ventriculin). It is now widely used.

The knowledge which has been accumulated by various investigators has been made available to the medical profession by means of numerous publications which have appeared in various medical journals. Each member of the staff has collaborated in the teaching of undergraduate and graduate students.

CYRUS C. STURGIS

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The Homeopathic Medical College

THE HOMEOPATHIC MEDICAL COLLEGE

BURKE A. HINSDALE stated that homeopathy was first recorded in University history in 1851 (Hinsdale, p. 106). However, as early as 1848 the practitioners and patrons of homeopathy in Michigan were petitioning the legislature and the University, setting forth their rights and claims, to the end that homeopathic instruction be included in the curriculum of their state institution. The abstract of the minutes of the Michigan Institute of Homeopathy in 1849, printed in the *Michigan Journal of Homeopathy*, mentioned the appointment of a committee of three to "address the Regents of the University of Michigan, praying them to establish a Professorship of Homeopathy in the Medical Department of that college" (1: 105). Even earlier, committees were appointed by various lay groups to formulate petitions of a similar nature. The first meeting of the Michigan Institute of Homeopathy in 1845 devoted a portion of the single session of June 12 to the question.

Previous legislation regarding medical practice in the state included a law passed in 1846 (*Mich. Rev. Stat.*, 1846, pp. 168-73), giving to the state and county medical societies power to issue and revoke licenses to practice, and making all persons who practiced as physicians or surgeons without obtaining such license subject to fine or imprisonment. The result of the activity on the part of groups of physicians to pass laws favorable to themselves was an action by the legislature to place the question of medical practice and its control in the hands of the committee on the judiciary for investigation. In 1851 the Honorable Thomas B. Church, chairman, reported that "sundry petitions praying for . . . the establishment of a professorship of

homeopathy in the University of this State" were referred to his committee. He discussed the general medical situation in regard to its legal control and advised that Chapter XXXVI of the *Revised Statutes* of 1846 be repealed. This was done. Further, he recommended that the homeopathic question be referred to the newly appointed Board of Regents, "fresh from the people," who had been elected under the Constitution of 1850. The several petitions were referred to the committee on education of the legislature.

In the memoir prepared by Dr. Zina Pitcher at the request of the Regents, embracing an epitome of the transactions of that body from 1837 to 1851 (*J. Doc.*, 1851, pp. 312-28), several pages were devoted to this question. Pitcher took a militant stand against any favorable recognition of the petitions or of the petitioners. One gathers that the author was expressing his personal views rather than the considered opinion of the entire Board. Petitions, both to abolish the Department of Medicine and Surgery, founded in 1850, and to establish homeopathic instruction in that department, constituted the immediate occasion for this part of the memoir. It must be remembered that Dr. Pitcher was the sole author of this review. However, a perusal of the document will explain the feeling that any discussion of the subject must have caused.

Several problems were satisfactorily solved with the election of the new Board of Regents in 1851, but the exact delineation of its powers was still to be determined. For forty years the homeopathic controversy furnished the trial material which at last made hard and fast the position of the Board in relation to the lawmaking and judicial bodies in

Michigan (see Part I: CONSTITUTIONAL STATUS).

An interesting episode developed regarding the selection of a president by the new Board. In June, 1852, Tappan was favorably considered, and during the investigation of his abilities and background, Dr. Pitcher, using the name of D. B. Minor, wrote Dr. Vanderburgh of New York—Tappan's medical adviser and a homeopathic physician. According to Vanderburgh (*Mich. Journ. Homoeop.*, 2: 126-27) the letter expressed a sympathetic attitude toward homeopathy and asked whether or not Tappan's inclination was in that direction. An affirmative reply resulted in Tappan's temporary defeat, if we may believe the letter from Vanderburgh which shows his chagrin at being tricked. In July of the same year, the Board elected to the presidency the Reverend William Adams, much to the amusement of Vanderburgh, who had been his physician for twenty years (*ibid.*, p. 124), but Adams declined. As a consequence, the lesser of the two evils, as viewed by some of the Board, was the reconsideration and election of Tappan. From fragments of reports and contemporary correspondence one gathers that Dr. Pitcher was disappointed but continued to be the constructive worker he always had been.

From 1851 to 1855 the legislature and the new Board of Regents were continually being bombarded with petitions and various other legal procedures to induce them to include homeopathy in the University curriculum. Most of these instruments, at least those addressed to the legislature, were referred either to the committee on the judiciary or to the committee on education. The committee on education was responsible for the examination of the organization of the University. As a result of these activities the legislature of Michigan in 1855 passed an act providing for the appoint-

ment of at least one professor of homeopathy in the Department of Medicine and Surgery (*Laws*, 1855, No. 100). For the next twelve years, an almost constant legal battle was waged to compel the Regents to comply with the act. They refused to do so, and since the act of 1855 provided no enabling funds they resisted all efforts against them. However, the real reason for the refusal is apparent from contemporary correspondence between the Regents and various state officers. While there was very real opposition to teaching homeopathy in the University, the main objection arose from the effort to establish chairs of homeopathy in the Medical Department. Until this effort was abandoned the partisans of homeopathy were doomed to failure.

About the time of the passage of the 1855 law, Dr. A. I. Sawyer, a graduate of the Western College of Homeopathic Medicine in 1854, took up his residence in Monroe, Michigan. Intensely partisan, gifted with intelligence and sound political judgment, he hurled himself into the fight. It was said that for twenty-five years he attended nearly every session of the Board of Regents and of the legislature as well. Very promptly dissension developed in the homeopathic ranks and a demarcation appeared, based, first, on the championship of Ann Arbor as the proper location for the homeopathic teaching as against Detroit; and, second, on the belief that it would be wise to add homeopathic chairs to the Medical Department rather than to establish a separate college within the University. As a consequence, the attack lost momentum and, on occasion, lost its force entirely.

At the annual meeting of the Michigan Institute of Homeopathy in 1866 a committee was appointed to employ counsel to apply to the Supreme Court of the state to force the Regents to comply with

the law of 1855 (*Proc. Mich. Homoeop. Instit.*, p. 3). To this end the members of the Institute were assessed to defray the costs of such a step. Possibly it was as a result of this move that the rider was added to the law of 1867 (see Part I: CONSTITUTIONAL STATUS).

It must be remembered that the growth of the University during the fifties and sixties had exceeded its resources, and had the legislature not come to its relief in 1867 serious consequences must have followed. In that year a law was passed giving to the University one-twentieth of a mill from each dollar of taxes collected (*Laws*, 1867, No. 59). To this bill a rider was attached rendering void the mill tax assessment unless at least one professor of homeopathy were appointed in the Medical Department. Much excitement followed, and many resignations were offered. The department most affected succeeded in delaying the action for one year, and at the end of that time the Regents endeavored to establish a school of homeopathy outside Ann Arbor but under University auspices (see Part I: CONSTITUTIONAL STATUS).

In 1869 an act was passed amending the law of 1867 and appropriating \$15,000 to the University directly instead of continuing the tax rate of one-twentieth of a mill (*Laws*, 1869, No. 14). In this act homeopathy was not mentioned. Petitions and injunctions were again the order of the day, and dissension in the ranks of the petitioners served only to heighten the controversy. The Michigan Institute of Homeopathy, founded in 1847, had taken the leadership in the attack on the Regents and the legislature. Legal steps begun by laymen and taken eventually to the Supreme Court were instigated by the Institute. In 1870 the Homeopathic Medical Society of the state of Michigan was organized, however, and at the second meeting, in May, 1871, all the books and

papers of the old Institute of Homeopathy were taken over (*Trans. Homoeop. Med. Soc.*, 1871, p. 3).

At this meeting a committee was appointed to "institute legal proceedings against the Board of Regents of the University of Michigan" to enforce the law of 1855. The continued efforts of this committee were being felt in both University and state circles—so much so, in fact, that the meeting of the Regents in September, 1871, brought forth the following resolution:

Resolved, That we approve the efforts that are being made to establish a Homeopathic Medical College at Detroit, to be eventually connected with the University, and when we are authorized to make it a part of the University by law, with proper provisions for its support, we will administer its affairs to the best of our ability. (*R.P.*, 1870-76, p. 156.)

Prior to this a memorial had been presented, signed by citizens of Detroit (*R.P.*, 1870-76, p. 104), offering land for the site and money for the erection and conduct of such a school in Detroit, to be connected with the University. Just what was intended by this resolution is not clear, but it served to hearten the group interested in establishing such a school in Detroit. And the direct result may have been the launching of the Michigan Homeopathic Medical College at Lansing in November, 1871, though the first announcement of this college makes no attempt to claim a University connection.

The result of the legal steps taken by the Homeopathic State Society was a Supreme Court decision against forcing the University to establish a chair of homeopathy in the Department of Medicine and Surgery. A second college to be organized in Detroit with the backing of the Regents was discussed at a meeting of the state society. At this meeting the president's address stressed the fact

that dissension in the ranks caused the failure to force the Regents to recognize homeopathy in the University. Three points of view were put forward: one group wanted a teaching unit outside Ann Arbor; the second faction urged enforcement of the law of 1855; and a third group insisted on abandoning the fight because it was prejudicial to the good name of the University. The two sessions of the society in 1871 (May and November) served to crystallize the sentiment of that body into a set of resolutions insisting on the teaching of homeopathy in the Department of Medicine and Surgery.

On March 20, 1873, the House of Representatives appointed a committee with instructions to proceed to Ann Arbor to study the question whether homeopathy could be successfully taught in the Department of Medicine and Surgery. To this end nineteen responsible witnesses, all faculty members, were questioned, and testimony covering 110 closely written pages was obtained. Included among the witnesses were such men as President Angell, Judge Cooley, Professors Douglass, Cocker, Williams, and Olney, and, finally, Dr. Corydon L. Ford, Professor of Anatomy. All these men testified that to teach homeopathy in the Medical Department would be a great mistake and would ultimately kill the department itself. One must remember that in the year before the Department of Medicine and Surgery was opened, 1850, there were only sixty students in the University, and that in the fall ninety students began the study of medicine. In the early seventies there were 575 registered in the Department of Medicine and Surgery alone. Any legislation unfavorable to this important unit of the University was considered seriously. The testimony reveals that both President Angell and Judge Cooley employed homeopathic physicians at the

time of the interview by the committee.

The legislative committee of the State Homeopathic Society, due to the "unwieldy industry . . . and Spartan courage of Dr. S. B. Thayer" (*Mich. Journ. Homeop.*, 1 [1873]: 89), its chairman, succeeded with the legislators, and as a result a law was passed in 1873 appointing two professors of homeopathy in the Department of Medicine and Surgery and repealing all other laws of related content (*Laws*, 1873, No. 63). That same year the 1869 law—or, rather, amendment (see Part I: ANGELL ADMINISTRATION)—granting a lump sum to the University was repealed and again one-twentieth of a mill was assessed against all taxable property for the benefit of the University (*Laws*, 1873, No. 32). This bill had no rider attached, since special legislation had solved the situation relative to the teaching of homeopathy.

The Regents again refused to comply with the law, urging that, because of the existing state of feeling, it was impossible to combine the teaching of two schools of medicine in one department. Since no special funds had been appropriated, nothing was done. As has been said, the Regents were consistent and had been so from the first. From 1851 to 1875 the controversy was constantly in evidence, a controversy developed in part for the general public welfare, but in no small part for the play of personal ambition and desire for partisan advantage. The enemies of the University displayed great zeal in creating strife and used homeopathy as a shield.

The gradual trend toward the establishment of a separate school was very noticeable after 1871. Early in 1875 the Regents restated resolutions adopted two years before, declaring their willingness to assume direction of a separate School of Homeopathy when funds should be provided for its support. This action was predicated on the knowledge

that the legislature then in session would act favorably on a bill which was to be presented, establishing such a school. As expected, in April, 1875, the law was passed establishing a Homeopathic Medical College as part of the University in Ann Arbor.

For almost twenty-five years (since 1851) the Regents had been in a position of opposing the legislature, and they had always denied that this position was the result of "factious opposition to . . . that body," as Hinsdale put it. Rather, they had insisted that the true and best interests of the University were being served by their attitude. In the state generally, a large group felt that the wishes of the commonwealth were being ignored.

The year 1875 proved a busy one for the administration of the institution in Ann Arbor. Both the College of Dental Surgery and the Homeopathic Medical College were organized. On May 11 the Regents passed resolutions that seemed wise and far-reaching in their effects. In brief, they accomplished the following: The Homeopathic Medical College was established, with two professors appointed to it, one, a professor of materia medica and therapeutics, and the other, a professor of the theory and practice of medicine. (The students paid the same fees as those in the Medical Department and received instruction in that department in all work except that included under the two homeopathic chairs.) The same conditions as to curriculum and graduation were observed in both schools and it became the duty of the president to see that all rules were enforced. The homeopathic medical graduates received diplomas designating the college in which they were enrolled.

The new college grew rapidly for some time. President Angell, in his report for 1877, observed that it had fully twice as many students as in the preceding year,

and "the number this year promises to be at least half larger than it was last year" (p. 159), in spite of the fact that it was "the only Homeopathic School which has courses of nine months, and it must attract the students, who desire a thorough training" (p. 159).

Both President Angell and the Board of Regents were sincere in hoping that this experiment would prove successful, because it removed at least one obstacle from the path of much-needed legislation for steady financial support of the University. The friends of homeopathy, and those partisans aligned with them from other motives, were silenced. The plan was to keep them so.

The State Homeopathic Society wisely recommended for the two chairs men widely removed from the bickerings and discussions of the local groups. Samuel Arthur Jones (M.D. Missouri Homeopathic Medical College '60, M.D. Homeopathic Medical College of Pennsylvania '61), of Englewood, New Jersey, was chosen to teach materia medica and therapeutics, and John Coleman Morgan (M.D. Pennsylvania Medical College '52) of the Hahnemann College of Philadelphia, was selected for theory and practice. The correspondence of these two appointees with the President prior to their acceptance of the positions is most interesting. Though Dr. Angell's letters have not been available, the other half of the communications of the two men has been preserved, and shows an earnest desire by both the administration and the prospective faculty members not to overstate or understate the situation. The prejudices on the part of members of the medical faculty were fairly stated and were as fairly considered, if one may judge from the responses of the two men appointed. Dr. Jones, particularly, became an important figure in the life of Ann Arbor. In addition to his professional ability, he

was a scholar recognized for his knowledge of the literature of Thoreau and Carlyle. The greater part of his book collection is now in the University Library. He became the first Dean of the Homeopathic Medical College.

The long controversy that had begun before the founding of the Department of Medicine and Surgery was quieted with the founding of the Homeopathic Medical College in 1875, but flared periodically, as in the attempt to amalgamate the two schools in 1893, and in the legislative action of 1895 directing that the College be moved to Detroit. In both instances the Regents refused to comply.

The right of the Regents to act independently of the legislature was finally established on a firm and unquestioned basis largely through this controversy. In the decision anent the 1895 removal, the court said, in effect, that the Board of Regents was empowered by the state constitution to have direct and exclusive control of the University as direct representative of the commonwealth (see Part I: CONSTITUTIONAL STATUS).

The legislature, however, exerted pressure through its control of appropriations. The act founding the Homeopathic Medical College provided for additional funds—a device which had not been utilized in any previous legislation on this question. The fear of harm to the Medical Department, which had activated the Regents up to this time, was quieted, and a sincere effort was made to organize the new College in such a way as to ensure scientific soundness in its teaching.

From the founding of the College to its termination very little of a major controversial nature developed between the two medical schools in Ann Arbor. Difficulties involving personalities were of frequent occurrence, but nothing that approached the problems of the previous twenty-five years gave cause for official action. As much cannot be said for the

cause of homeopathy itself. The internal dissension among the practitioners in the state erupted often and vigorously. Resignations and new appointments were frequently made, in an effort to soothe the various elements.

During the years following 1875, the need for funds grew more and more acute and jeopardized the entire program of the University, which was receiving the one-twentieth of a mill from the total state tax collection granted in 1873. The mill-tax rate was changed in 1893 to one-sixth of a mill; and the act (*P.A.*, 1893, No. 19) included the proviso: "The Board of Regents . . . shall maintain at all times a sufficient corps of instructors in all departments . . . as at present constituted, . . . said departments being known as [listed with other units] the Homeopathic Medical College. . . ." Failure to observe this clause carried a penalty of reduction of the funds to one-twentieth of a mill. So was brought into existence the homeopathic rider which was guarded so jealously by its partisans.

In 1899 the rate was raised from one-sixth to one-fourth of a mill, but the rider was retained. No further change was made until 1921, when, under the regime of President Burton, the rider was dropped from the appropriations bill. As an immediate consequence the legislature passed a resolution requesting the Board of Regents to effect a consolidation between the two medical schools and their respective hospitals (see Part I: CONSTITUTIONAL STATUS and BURTON ADMINISTRATION).

In the early days of the new College, feeling ran so high that the position of medical men in both schools was difficult. But as the new unit grew the situation eventually resolved itself, though the anomaly of two medical schools within one university was never without its critics. This growth was such that when the legislature in 1895 reversed itself and or-

dered the Homeopathic Medical College moved to Detroit, the Regents battled successfully to retain it in Ann Arbor.

All medical faculty groups before the turn of the century were torn with dissension that arose largely from the individual jealousies so prone to develop among men who devote a part of their time to private professional activity. All men teaching clinical subjects were so occupied. The Homeopathic Medical College presented a typical picture of such a group. The later eighties saw the development of a long and bitter personal quarrel which culminated in the sending of a letter signed by four faculty members to the Board of Regents requesting the removal of the Dean. Dean Henry L. Obetz, as a defense measure against his colleagues and as a means of settling their differences, had suggested a scheme for amalgamating the two medical departments. This was not formally presented to the Board, but individual Regents knew that such an idea was being considered by certain members of both medical faculties. The American Institute of Homeopathy addressed a communication to the Board arguing against such a merger. The reply to this letter shows conclusively that no such plan had been formally considered, nor would be, unless presented as the expressed desire of both faculties. In part, the answer stated: "It has been and will be the pleasure of this Board to advance to the utmost of its power, within the means at its disposal, the interests of the School of Homeopathy" (*R.P.*, 1891-96, p. 370).

The Dean was vindicated completely of any harmful intent and resigned voluntarily in November, 1894. At the meeting at which the resignation was acted upon, the Board called for the resignation of the remaining members of the homeopathic medical faculty, to take effect in October, 1895. These were forth-

coming as requested. An entirely new faculty, headed by Wilbert B. Hinsdale (Hiram '75, M.D. Homeopathic Hospital College of Cleveland '87, A.M. hon. Hiram '00, A.M. hon. Michigan '34) as Dean, was appointed. Dean Hinsdale, an able administrator, a scholar, and a competent physician, occupied his position till the merger of the two medical schools took place in 1922.

Soon after the appointment of the new faculty the legislature in 1895 enacted a law which in effect directed the Regents to move the College to Detroit (*P.A.*, 1895, No. 257). At their meeting in December, 1895, the Board drew up a resolution refusing to comply with the law. The proponents of "removal" carried the matter to the Supreme Court of the state, where it was decided that the law was constitutional. But the Board still refused to obey, thus completely reversing its position of the sixties and early seventies, when it wished to aid in organizing a school outside Ann Arbor. Then a mandamus was asked in order to compel the Board to obey the law. The court in replying to the request ruled that inasmuch as the Board had full control of all matters appertaining to the University, it might obey the law or not, as it chose.

The decision regarding the mandamus proceeding was more momentous for the University than it was for the Homeopathic Medical College. It reaffirmed the decision of 1859 by the same court, as clarified at that time by Judge C. B. Grant. A joint committee of members of the law and homeopathic committees of the Regents reported to the Board in January, 1897 (*R.P.*, 1896-1901, pp. 21-29). This report explains the refusal to obey the law. It was maintained that although land in Detroit for the College had been promised, none had been deeded to the University; further, that Grace Hospital, which was to be

used by the College, had been deeply in debt for years, and that no guarantee was forthcoming that it could be maintained without expense to the state. In obeying the law, the Board would be in the position of assuming the burdens without receiving the benefits contemplated by the act. These reasons rather than a desire to keep the school accounted for the action taken.

The new faculty appointees took part in the "removal" fight as their initial activity in the University. The struggle moved through the legislative halls to the Supreme Court, and at last back to the Regents, where the decision was final.

Strangely enough, the final years of the School were comparatively free from controversy. Periodically, as new appropriations were being considered, the proponents of homeopathy saw to it that the rider was included in the act as finally passed. In 1921 the legislature passed a resolution requesting the Regents to consolidate the two medical schools for reasons of economy. The Board complied promptly, in 1922 (*R.P.*, 1920-23, pp. 373-74), with the result that the teaching of homeopathy became University history.

From 1875 to 1922 the deanship of the College was conferred upon five men: Samuel A. Jones, 1875-78, Edward Carroll Franklin (M.D. University of New York '46), 1878-83, Thomas Pardon Wilson (M.D. Western Homeopathic College [Cleveland] '57), 1883-85, Henry Lorenz Obetz (M.D. Homeopathic Hospital College of Cleveland '74), 1885-95, and Wilbert B. Hinsdale, 1895-1922. Beginning with two departments—that of the theory and practice of medicine and that of materia medica—the institution gradually expanded, until, in 1909, all the branches of clinical medicine were taught in separate departments.

The Department of Surgery, organized in 1876, was headed by John C. Morgan. He was followed by Dr. James G. Gilchrist, 1876-78; Edward C. Franklin, 1880-83; Henry L. Obetz, 1883-95; Oscar Le Seure ('73*m*, M.D. Bellevue Hospital Medical College '74), 1895-1900; Dean Tyler Smith (Nebraska '87, M.D. Chicago Homeopathic Medical College '89, M.S. hon. Michigan '14), 1901-14; and Hugh McDowell Beebe ('07*h*), 1914-22. The separate Department of Gynecology and Obstetrics was also organized in 1876, with Dr. Frank Augustus Rockwith (M.D. College of Physicians and Surgeons [N. Y.] as head. He held this position for one year. Newton Baldwin ('75*m*) was appointed in 1883 and served two years; James Craven Wood ('79*h*, A.M. Ohio Wesleyan '91) served in the years 1885-93; Maurice Patterson Hunt (M.D. Homeopathic Hospital College of Cleveland '79), 1893-95; Myron Holly Parmelee (M.D. Hahnemann Medical College [Chicago] '70), 1895-97; Claudius Bligh Kinyon (Illinois State Normal University '76, M.D. Chicago Homeopathic Medical College '78), 1897-1918; Theron Grover Yeomans ('09*h*), 1918-20; and Scott Clark Runnels (M.D. Indiana '07, '08*h*), 1920-22.

The Department of Materia Medica, organized by Samuel Jones, maintained a high degree of excellence. This department was served in turn by Jones, in the period 1875-80, by Henry C. Allen (M.D. Western Homeopathic College [Cleveland] '61), 1880-84; by Allen Corson Cowperthwaite (M.D. Hahnemann Medical College '69, Ph.D. Central University of Iowa '76, LL.D. Shurtleff '88), 1884-85; by Hugo Emil Rudolph Arndt (M.D. Western Homeopathic College [Cleveland] '69), 1885-89; by Charles Samuel Mack (Harvard '79, M.D. College of Physicians and Surgeons [N. Y.]

'83), 1889-95; and by Willis Alonzo Dewey (M.D. New York Homeopathic Medical College '80), 1896-1922. Instruction in the theory and practice of medicine, with Morgan as the first Professor, developed rapidly. After Morgan, in 1879, was Charles Gatchell (M.D. Pulte Medical College [Cincinnati] '74), who served for one year and later returned and occupied the chair from 1883 to 1893. Eugene Ransom Eggleston (M.D. Homeopathic Hospital College [Cleveland] '75) served during the years 1893-95, and Wilbert B. Hinsdale, 1895-1922. Dr. Hinsdale carried on work on American Indian archaeology for many years thereafter as a member of the staff of the University's Museum of Anthropology.

The separate Department of Pharmacology was started in 1882 and until 1919 was administered by the professor of materia medica. During the last three years of the School's existence Linn John Boyd ('18*h*) was in complete charge, and during his regime some excellent work was done. Boyd later became head of the Department of Internal Medicine in the New York Medical College.

The teaching of ophthalmology, otology, laryngology, and rhinology was all done within a single department in 1880, under Thomas P. Wilson. Charles Frederick Sterling (M.D. Pulte Medical College [Cincinnati] '77), appointed in 1887, served until 1889; he was followed by Daniel A. MacLachlan ('79*h*), 1889-95. Royal Samuel Copeland ('79*h*, LL.D. Syracuse '23), later United States Senator from New York, held the position in the years 1895-1908, and Dean Wentworth Myers ('99*h*) during the period 1908-22.

Some clinical subjects were taught by nonresident instructors. Rollin Howard Stevens ('89*h*), Professor of Dermatology (1904-9), made an outstanding contribu-

tion in his field. O. R. Long headed the Department of Nervous and Mental Diseases from 1890 until 1914. Both of these men were nonresident.

The necessity for enlarging the scope of instruction, which by 1909 resulted in so many separate departments, led to unforeseen difficulties. The duplication of departments in the Homeopathic Medical College and the Medical School resulted in a great deal of unfavorable comment among both the friends and the enemies of homeopathy. In the original plan no duplication had been intended, and the trend was most unfortunate. Then, too, the number of students in the Homeopathic College fluctuated within very wide limits, never exceeding 125 and often less than fifty. The steadily increasing budget of the school was offset largely by income from the University Homeopathic Hospital, which was showing a steady growth. Here, as well as in the school proper, the duplication was apparent. The Hospital rendered a great service to both the University and the state, and this service was recognized widely.

For a time after the Homeopathic Medical College was organized, a part of the hospital of the regular Medical School on the campus was used by the department (*P.R.*, 1877, p. 13). This arrangement, however, proved unsatisfactory, and in 1879 an appropriation of \$6,500 was made by the Regents for the erection of a Homeopathic Hospital and amphitheater, as an extension of the west professorial residence on the north side of the campus, together with \$1,250 for hospital expenses. This building served the department until, as part of the Hospital group on Catherine Street, a new hospital was built in 1891. This was occupied until the erection of a third hospital in 1900, when it was taken over by the regular Medical Department and

became the Medical Ward. It was destroyed by fire in 1927.

The Homeopathic Hospital, providing for one hundred patients, erected in 1900 on the northeast corner of the campus, served until the department was discontinued in 1922. It is now known as North Hall. As an addition to this building a children's ward was erected in 1918 just to the south, which was later the Health Service; since 1940 it has been the Annex to the University Museums. For many years the old residence of Judge William A. Fletcher, at one time Regent of the University, stood near this hospital and was used first as a nurses' home and later as an administration building. Subsequently, quarters for

nurses were provided in the hospital building and in near-by residences taken over by the University.

As the institution increased its patronage, however, the legislature became more and more cognizant of two medical schools in one University, each with an associated hospital. The natural result was a move to consolidate by a merger of the two schools. This was resisted by the members of the homeopathic medical faculty, and the resultant merger never received their co-operation. The subsequent history of the merger was much as had been predicted by the enemies of such a move prior to 1875 (see Part I: BURTON ADMINISTRATION, p. 85).

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The Law School

THE LAW SCHOOL

THE ESTABLISHMENT OF THE DEPARTMENT.—It has now been officially decreed that the birthday of the University of Michigan is August 16, 1817, and that the birth certificate is "an act to establish the Catholepistemiad, or University, of Michigania." The author of this act was a lawyer, Judge Augustus Woodward. He provided for thirteen *didaxiim*, or professorships, including a *didaxia* of medical sciences but no *didaxia* of the law. Although in Judge Woodward's fantastic analysis of the field of knowledge, in his book *A System of Universal Science*, he included the law as a department called *themistia* under the division of *ethica*, yet there is no evidence that in his Catholepistemiad he planned for a *didaxia*, or professorship, of law, much less of a department of law, in the University of Michigania.

This is not strange, for in 1817 law schools in the modern sense were unknown. At that date it was the universal practice to prepare for admission to the bar by private study, usually under the tutelage of a lawyer and in his office. Professorships of law there had been. One was held by Wythe at William and Mary, one by Wilson at Philadelphia, still another by Kent at King's College (later Columbia), and a few others, but the first law school, if the so-called Litchfield School of Judge Reeve, which flourished from 1784 to 1833 in Connecticut, be excepted, was Harvard, established in 1817, at Cambridge. There, two professors and three students in two small rooms constituted the beginning of the first separate law school connected with a university. By 1837 the brilliant work and strong personality of Story had built up the school's enrollment to sixty-three.

Twenty years later, on March 18, 1837, the organic act of the University of Michigan, under which the present-day University in Ann Arbor came into existence, was approved. Section 8 provided that "the university shall consist of three departments. 1st. The department of literature, science, and the arts. 2d. The department of law. 3d. The department of medicine." It was also provided that professorships should be established in the Department of Law: "one of natural, international and constitutional law; one of common and statute law and equity; one of commercial and maritime law" (*Laws*, p. 102).

If before 1817 there had been no law school as part of a university, by 1837 it was quite otherwise. Of such schools still surviving there were then Harvard (1817), Yale (1824), University of Virginia (1826), University of Cincinnati (1833), and New York University (1835). But enrollments were small; nearly all lawyers still came to the bar by the office route, though here and there it began to be sensed that this was not adequate preparation. Men learned to be lawyers at the expense of their clients, law tended to be an art and not a science, lawyers to be artisans skilled in narrow and mechanical technique—pettifoggers and not scholarly lawyers and judges with broad views of their science. There were, however, many exceptions.

The very slender resources of the University delayed realization of the plans of the act of 1837. The medical profession urged vigorously the establishment of a school of medicine, but the great body of lawyers was indifferent or even hostile to the idea of a law school. And so medicine, though named third and after

the law in the organic act, preceded the law by ten years in the establishment of a school.

The University *Catalogue* of 1852-53 differs strikingly from its predecessors. Michigan's first president, the Reverend Henry P. Tappan, had arrived. In the *Catalogue* he laid down in broad outline his celebrated plan for a system of public instruction. He called for the education of teachers, preachers—by theological faculties which he hoped would be established outside the University by the different denominations—doctors of medicine, engineers, agriculturalists, followers of the mechanic and industrial arts, and, of course, those taking the traditional college course in science, literature, and the arts. He looked beyond these to the proper development of a university, as distinguished from a college—to the development of graduate and professional work, or, as he called it, a "university course," to which the Medical Department already established properly belonged.

Strangely enough, neither in the *Catalogue* of 1852-53 nor in those of the succeeding years to and including that of 1859, is there any word about instruction in law, much less about a department of law. That he was not unaware of the requirement of the act of 1837 that there be a department of law we know, because in his report to the superintendent of public instruction for 1853 (*J. Doc.*, 1854, No. 6, pp. 51, 53) he included as suggested subjects for the university course: "The Law of Nature—the Law of Nations—Constitutional Law." He further said:

For the completion of the University thus successfully commenced, the following particulars may be mentioned as necessary:

3. The establishment of a Department of Law. This has been prescribed by statute, and ought not to be delayed any longer. Ap-

plications are frequent on the part of law students. Unquestionably a very considerable number would resort here immediately.

In his report to the Regents in 1856, President Tappan envisaged a university that, with provision "to complete its buildings, to enlarge its Library and apparatus, and to establish its Law Department . . . would very soon be surpassed by none." There was, however, in the yearly University *Catalogue* no reference to instruction in law or to a law department until, suddenly, in 1860, the Department of Law was announced as already existing, with three professors and ninety-two students. From the *Regents' Proceedings* and other sources it is learned that petitions had been presented and that a Regents' committee had been appointed, which had made a study of existing law schools and had recommended the establishment of a law department. On March 29, 1859, the Regents acted on this report and voted that the Department of Law be opened on October 1 of that year. The next day they chose as law professors in the University of Michigan, at a salary of \$1,000 each, the Honorable James V. Campbell, Charles I. Walker, and Thomas M. Cooley. These were to designate one of their number to deliver the opening address. This faculty chose Professor Campbell and elected him Dean. Cooley was chosen Secretary.

The advance announcement of the opening of the Law Department was made, not in the University *Catalogue*—the plans were not completed in time—but by advertisement in the papers in Detroit, Chicago, New York, Cincinnati, St. Louis, and Washington, D. C. This was a notice to a national constituency, and it met with a national response which has continued to the present day. In the first year nine different states and England were represented, and by the third year students had been admitted from every New England state as well

as from a number of other Eastern states, most of the Middle Western states, Kentucky in the South, and California on the Pacific coast.

By special action of the Regents twenty-four students were granted the degree of bachelor of laws (LL.B.) at the end of the first year. Attendance grew rapidly. In 1865-66, 385 were enrolled in the Department of Law, whereas there were only 335 in the Department of Literature, Science, and the Arts. The Department of Law had become the largest law school in the country, and such it remained for many years. Incidentally, so far from being a financial burden on the University, as had been feared, it became a source of net income. The President and Judge Cooley, in their reports to the Regents, often pointed out that the fees of nonresident students more than paid the current expenses of the department.

If one considers the meager attendance at other law schools in those early days it is not strange that the Regents allowed their financial straits to delay the opening of the Department of Law. In their report they pointed out that it was predicted that the professors would lecture to empty benches. But in the light of the results it would seem that an earlier establishment of the Department of Law would have helped the general exchequer of the University. In the *Catalogue* of 1860 it was stated that "its success thus far has exceeded expectation," and in 1862 that "the success of this Department has more than equaled the highest expectations at the time it was first opened."

HISTORY AND DEVELOPMENT.—An immediate need of the department was a home. At first the lectures were given in the old chapel in Mason Hall. The books of the library were placed on shelves in one end of a room in this "South College" (see Part VIII: FIRST BUILDINGS).

The principal task of the student librarian was to feed wood to the box stove and to sweep the floor. In the week of the opening of the Department of Law in 1859 a committee of the Regents was appointed to devise ways and means for the erection of a suitable building. The surprisingly large enrollment made the quarters in the chapel very inadequate. An attempt was made at once to raise by subscription the sums of \$10,000 in Ann Arbor and \$5,000 in Detroit, to which the Regents were to add \$5,000, but the people of Ann Arbor and Detroit failed to appreciate their privilege. The building was ordered in 1861 and was completed in 1863, but the Regents had to pay the entire cost.

The new building, erected to the north of Mason Hall, gave the Law Department a lecture room, a small room for the Law Library, and some office room—all on the second floor (see Part VIII: HAVEN HALL). There were a few third-floor rooms. But the whole of the first floor was occupied by the General Library of the University until a new library building was erected in 1882-83. Thereafter for the next ten years, the department was the exclusive tenant of the building, which it had already outgrown. A considerable addition on the north was made in 1893, but immediate changes in methods of instruction and rapid growth in attendance made this inadequate almost before it was occupied. In 1898-99 the addition was wrecked. The original building was given a new addition on the north with offices and classrooms, and a larger addition on the south with classrooms on the first floor and much enlarged quarters for the library above. Here the department, which since 1915 has been officially designated the Law School, remained till 1933, when Hutchins Hall, the recitation and administration building named in honor of the late President Hutchins, was erected.

The buildings of the Quadrangle were made possible by the munificent gift of William W. Cook ('80, '82), of New York City. The plans had been carefully formulated by Mr. Cook, advised and assisted by Dean Bates of the Law School and by President Hutchins. The first section of the Quadrangle, completed in 1924, is known as the Lawyers Club. This strikingly beautiful group provides sleeping rooms and studies for 160 students, a great dining hall with capacity for 300 men, a spacious lounge, and, beneath, a recreation room of the same size—these two being a social center for the members of the club. Above the lounge are guest rooms for the accommodation of visiting lawyers and distinguished guests of the University.

In 1930 a large addition was opened, named for the donor's father, the late John P. Cook. It accommodates 117 students. In the following year the most conspicuous building, the beautiful William W. Cook Legal Research Library, was occupied. During his life Mr. Cook would not agree to have any of the buildings named for him. He died before the library was completed, and the Regents felt that his name should be recognized in this building. The library includes the main reading room, numerous research offices and conference rooms, alcoves, carrels, and book stacks with capacity for 275,000 volumes.

The final building of the Quadrangle was Hutchins Hall, the recitation and administration building for the Law School. Classrooms occupy the first and second stories. The third and fourth floors contain the faculty library and numerous offices.

Splendid as are the buildings of the William W. Cook Quadrangle, they are not so significant as is the purpose behind them. The donor caused to be carved in stone over the entrance to the Lawyers Club: "The Character of the legal pro-

fession depends on the Character of the Law Schools. The Character of the Law Schools forecasts the future of America." He intended to create a home in which teachers, lawyers, judges, and students preparing for practice should mingle, and where in a more or less cloistered life for the period of his law study the student should live and breathe in a legal atmosphere. He also intended to establish a center for legal research and for activities designed to improve the law.

The faculty of the Law School has in many respects been a remarkable one. From 1859 until 1865 it consisted of James Valentine Campbell (LL.D. '66), Marshall Professor of Law, Charles Irish Walker (LL.D. '74), Kent Professor of Law, and Thomas McIntyre Cooley (LL.D. '73), Jay Professor of Law. They began to lecture in 1859, and twenty-five years later they were still teaching. Professor Charles Walker, because of ill health, had to retire from 1876 to 1879, but he lectured again from 1879 to 1881 and again in 1886-87. Professor Cooley retired from the law faculty in 1884, and Professor Campbell in 1885. The original three were joined by Ashley Pond ('54), a practicing lawyer from Detroit, in 1865. Because of the demands of his practice he resigned in 1868 and was succeeded by Charles Artemas Kent (Vermont '56, LL.D. Michigan '99), who had been a student in the office of Professor Walker. This new professorship was named the Fletcher professorship in honor of Judge Fletcher of Massachusetts, who had made a valuable contribution to the Law Library. Professor Kent served until 1886. In 1874 another Detroit lawyer, William Palmer Wells (Vermont '51, A.M. *ibid.* '54, Harvard '54), joined the faculty, taking Professor Walker's place as Kent Professor of Law. He remained until 1885, and returned for the years 1887-91. In 1879 Alpheus

Felch (Bowdoin '27, LL.D. '77) was made Tappan Professor of Law.

Professor Felch was succeeded in 1883 by Henry Wade Rogers, the first full-time member of the faculty. With him began a new era, though part-time non-resident professors whose main occupation was in practice or on the bench continued as members of the faculty for many years, the last one, Otto Kirchner (A.M. hon. '94, LL.D. '19), retiring in 1906. After 1894 most of the work of instruction was given by full-time resident professors.

During most of this first twenty-five-year period the department had been the largest law school in the country. The attendance grew from ninety-two to 437 immediately after the close of the Civil War. It fluctuated between three hundred and four hundred for the rest of the first period, falling to 305 in 1883-84. Changes in the entrance requirements and in the curriculum were largely responsible for a sharp decline in enrollment, to 262, in 1884-85, but this decline was quickly checked and was followed by a continuous growth to 649 in 1894-95.

In the *Catalogue* for the years 1860 to 1871 and in the *Calendar* for 1871-72 through 1877-78 it was stated in each issue: "The sole requisites for admission are that the candidate shall be eighteen years of age, and be furnished with certificates giving satisfactory evidence of good moral character." In 1877-78 it was expected that all students would be well grounded in at least a good English education. This was an expectation rather than a requirement. No examination or test was announced. In the original manuscript "Record Book," still preserved, each student wrote his name, residence, place of nativity, and (after 1862) his age. The word of the student seems to have been all the evidence required. Of the class entering in 1862 five were eighteen

years of age, but in that and in the ensuing year many were over twenty-five, and not a few were past thirty. The average age for some time was more than twenty-three, and it was a requirement for receiving the degree of bachelor of laws that the candidate must be twenty-one. Not until 1910 were entrants to the first-year class required to be nineteen years old. That there were practically no entrance requirements in 1859 is not strange. No other law school asked more; relatively few students took a course in a law school; and in the entire Middle West at that time there were scarcely any high schools and only a few colleges where preparation might be secured (see Part I: BRANCHES). But these conditions changed, and it would seem that the University of Michigan might well have enforced advancing entrance requirements to its Department of Law long before this was done. Experience shows that undue delay in adopting higher standards when they are warranted causes the more desirable students to go where the requirements are more exacting. Moreover, if there is a temporary drop in enrollment when changes are made, this is speedily followed by an increase. President Angell in his reports to the Regents more than once called attention to the need of higher requirements and written examinations to test the prelegal training. Although there was a large attendance of able men, such requirements would have decreased the number of the "persons who do us no credit." In 1897 he noted with satisfaction that the requirements for admission had been materially raised, and, surprisingly, without a diminution in the number of applicants.

The *Calendar* for 1881-82 was the first to announce an examination of an applicant as to general education in order to determine his fitness to practice law as soon as his legal studies should be

completed. No subjects were specified until 1883, and a diploma was accepted as evidence of fitness. After 1883, with the coming of full-time professors, the faculty had more time to give to administrative matters, and could know the students and their progress better. Thus, under the deanships of Henry Wade Rogers (1886-91) and Jerome C. Knowlton (1891-95) entrance requirements were gradually increased.

With the coming of Dean Hutchins in 1895 further advances were announced for 1897, and later came the announcement that in 1900 and thereafter all candidates, except those admitted on certificate or diploma, must pass examinations equivalent to those required for admission to the Department of Literature, Science, and the Arts, that is, the equivalent of a four-year high-school course. Examinations were given, however, not by professors in the various branches of the Department of Literature, Science, and the Arts, but by members of the law faculty, and records show that the examiners were generous in grading papers. Still, this would have reduced materially the entrance of weak students but for the fact that those who feared to try these examinations or who failed to pass them might still be enrolled as special students. There were twelve special students in 1893 before the severer tests were applied, and the number of such students increased to eighty-three in 1903—more than 10 per cent of the enrollment. Since that date students under twenty-one, later under twenty-five, have not been admitted as special students, with the result that they have almost disappeared.

It was no doubt wise to increase entrance requirements gradually, but these advances were delayed so long that the school suffered severely—not quantitatively, for enrollment increased till the classes were too large, but qualitatively,

as is shown by the fact that in 1903-4 only 207 of the total 883 enrolled had college degrees. College graduates were drawn to law schools with higher entrance requirements. A college degree is not a sure hallmark of ability, but, as a whole, college graduates are far more promising as law students than those without such previous training.

The faculty was not blind to this situation and soon after 1903 urged a forward move. Some of the Regents objected, and it was not until 1912 that admission required one year of college work. In this year there were only 203 college-degree men out of a total enrollment of 856. In 1915 two years of college work were required, in 1926 three years, and in 1928 a college degree was made a prerequisite to admission to the Law School. A combined curriculum was offered whereby a student who had attained a high standing in three full years of college work at Michigan might receive his bachelor of arts degree upon completion of his first year in law, and his law degree upon meeting the requirements for that degree two years later. The Law School had become a graduate school.

The effect of these changes upon attendance was only to bring about a desirable drop from a high enrollment of 930 in 1909 to a steady enrollment, except during the war years and the first three years of the depression, of six to seven hundred students. The amount and quality of the work required of these students would have been quite impossible with the student body in the early nineteen hundreds. The present enrollment would be much larger if all applicants with college degrees were accepted. Diplomas are no longer accepted as evidence of fitness. A detailed certificate is required, and candidates are refused if their college record does not promise well for success in law study. The Law

School considers that the public needs are best served by quality and not by quantity.

THE LAW FACULTIES.—Of the great triumvirate—James Valentine Campbell, Charles Irish Walker, and Thomas McIntyre Cooley—which for so many years guided the destinies of the Department of Law, Professor Campbell must have been best known when the faculty elected him Dean and designated him to give the address on the occasion of the opening of the department. He was a distinguished member of the Supreme Court of the state. His position as Dean must have been largely nominal. He was never so designated in the University *Catalogue*, and from the beginning Professor Cooley seems to have been the active executive officer. He was elected Secretary, and the Regents in June, 1860, voted to give him \$500 additional salary on condition that he would move to Ann Arbor and be resident professor. He was also to give an additional course of lectures outside the Department of Law. It was considered undesirable that he "should very much enter into a course of professional business at or about this University" (*R.P.*, 1837-64, p. 907).

It has often been said that it was the renown of Judge Cooley's name that drew the larger proportion of students present from other states. In later years that may well have been the case, for his decisions on the state Supreme Court, to which he was elected in 1865, his numerous treatises on legal subjects, and more especially his classical works on *Constitutional Law* and *Constitutional Limitations* made his name familiar wherever the American or English law was known. But in 1859 he had been a country lawyer in what was then the small town of Adrian, had edited *Michigan Compiled Laws, 1857*, the *Michigan Digest*, revised in 1866, and was reporter for the *Michigan Reports*, volumes V to

XII. (Only volume V had been published prior to 1859.) This was enough to make him known to the Regents, notably to Regent Baxter, from near-by Tecumseh, who was a member of the Regents' committee on opening a law department, but hardly to possible students looking for a law school.

But if his fame was local at the beginning, his works growing out of his law lectures and his decisions on the Michigan Supreme Court have given him a place among the immortals with lawyers here and abroad. Justice William R. Day of the United States Supreme Court, formerly one of Judge Cooley's students, and who for a time lived in the Cooley home, said of him:

Here was a man of world-wide fame as a jurist—the author of a book which is at once the greatest authority upon the subject of constitutional limitations upon our government and a classic in legal literature—whose recreations seemed to consist in change of occupation, and whose energies seemed never to tire. (Shaw, p. 132.)

But if Cooley became best known, his colleagues were cultured and scholarly men of great ability, and they made a deep impression on the students who, in increasing numbers, sought here the fountain of their legal learning and never found it dry. As President Angell once wrote: "Never was a law school so fortunate as this was in beginning its work and continuing it for so many years under such gifted instructors" (Angell, *Reminiscences*, p. 233).

In 1871 Cooley succeeded Campbell as Dean, and he in turn was succeeded by Charles Artemas Kent, who had joined the faculty in 1868, and who continued as lecturer and Dean until 1886. This first twenty-five years covers an era in the Department of Law, the era of lectures by men active in practice and on the bench, who out of their busy lives gave a part of their time to the teaching

of law. With 1886 came in new men and new methods.

In the second twenty-five years Henry Wade Rogers ('74, A.M. '77, LL.D. Wesleyan '90) was Dean from 1886 to 1890, Jerome Cyril Knowlton ('75, '78), Acting Dean and then Dean from 1890 to 1895, and Harry Burns Hutchins ('71, LL.D. Michigan '21), Dean until 1910. From 1910 to 1939 Henry Moore Bates ('90, LL.B. Northwestern '92) was Dean. In 1939 Edwin Blythe Stason (Wisconsin '13, B.S. Massachusetts Institute of Technology '16, J.D. Michigan '22) succeeded to the position upon the retirement of Dean Bates.

Roughly speaking, the history of the Law School may be divided into three eras, 1859 to 1884, 1884 to 1910, and 1910 to 1940. In the first era the organization of the faculty was very loose. All three of the original members worked together to formulate policies and methods of instruction, and these were carried out with very slight change for the whole period. Toward the close changes were evidently being considered, so that when the three original members retired, almost together, plans were being laid for the changed work and methods of the second period. On the whole, Professor Cooley must be regarded as the leader in the first period.

The second era was one of gradual transition from instruction by lectures, with oral and not very rigid examinations of seniors only, the instructors being men primarily active in practice or on the bench, to instruction largely by recitations and classroom discussions based on textbooks and collections of cases and with predominantly resident, full-time professors. Examinations were written and were increasingly rigorous. At the beginning of this second period Henry Wade Rogers was the leader. He was the first full-time professor, the first who had had any training as a student in

a law school, the first to come to law teaching with almost no previous law practice. In 1890 he was called to the presidency of Northwestern University and was succeeded by another full-time professor, Jerome C. Knowlton. Harry B. Hutchins was appointed Dean to head the faculty for the last fifteen years of the period. Dean Knowlton in 1895 became again Professor Knowlton and so continued until his death in 1917. Dean Hutchins had been a professor in the department from 1884 to 1886, when he had gone to the newly organized Cornell Law School. In 1895 he returned to devote the rest of his life to the University of Michigan—as Dean of the Law Department till 1910, then as President till 1920, and as President Emeritus from that date till his death in 1930.

Dean Hutchins was admirably fitted by his past experience as teacher, practicing lawyer, and college professor to carry the Law School through the transitional period from 1895 to 1910. His law lectures were prepared with care, and were characterized by sound scholarship, crystal clearness, and a phrasing and wealth of illustration that made them intensely interesting. His dignified presence and his very speech are still vivid in the minds of students who sat in his classroom. He was equally effective in the courses conducted by the use of textbooks and in the so-called case method of teaching law. He made the fields of the law of real property and of equity peculiarly his own. He edited an American edition of the classical work, Williams on *Real Property*, and prepared a useful casebook on equity to accompany his lectures in that subject. He was a prime mover in the establishment of the *Michigan Law Review*.

Under the leadership of Dean Hutchins there was built up a faculty composed almost exclusively of men who devoted all of their time to the Law School.

The entire faculty undertook a study of policies and methods of instruction, a procedure never before possible. Entrance requirements were gradually increased, the course was lengthened to three years, and the lecture system almost disappeared. Standards for graduation were made much higher, and the student body became one of the busiest on the campus.

Under the leadership of Dean Bates, in the third era, all these movements went on with accelerated pace. The basis of study in nearly all the work became collections of cases in the various subjects. Scholarship took on a new content, and independent research was fostered on the part of students and faculty. Some of the faculty were released from part of their teaching duties to devote time to special research projects, and graduate students were engaged in intensive studies in various lines.

Among those who served on the faculty for extended periods in the later years were Victor Hugo Lane (C.E. '74, '78/), Robert Emmet Bunker ('72, A.M. '75, '80/), Grover Cleveland Grismore ('12, J.D. '14, S.J.D. Harvard '21), Edwin Charles Goddard (Ph.B. '89, '99/), Joseph Horace Drake ('85, '02/, Ph.D. '00), Evans Holbrook (Stanford '97, Michigan '00/), Ralph William Aigler ('07/), John Barker Waite (Yale '05, Michigan '07/), Edgar Noble Durfee (Harvard '04, J.D. Chicago '08), and Burke Shartel ('11, J.D. '13, S.J.D. Harvard '19).

PROGRAM OF STUDIES.—The act of March 18, 1837, section 8, provided three professorships. In 1858 it seems to have been assumed that one professor might hold all these professorships. But the Regents' committee, in its report of March 29, 1859, recommended three—one of common and statute law; one of pleading, practice, and evidence; and one of equity, jurisprudence, pleading, and

practice. To these three professors were to be assigned the general subjects of international, maritime, civil, commercial, and criminal law, medical jurisprudence, the jurisprudence of the United States, and other branches of law. The system of lectures, study, practice, and examinations was to extend through a period of two terms, the length of each term being from the first of October to the last Wednesday of the ensuing March. Moot courts were to be organized and other measures were to be taken to promote the practical knowledge and application of the principles taught. The course was to be so arranged that a student might begin with either term. The plan was adopted by the Regents. The extension of the term to nine months was proposed the second year, but a committee of the Regents reported adversely, and the six-month term continued until 1883, when, Judge Cooley favoring but other members of the faculty undecided, the term was made, like that in other departments of the University, nine months.

For almost forty years each professor was accustomed to enter in the "Record of Law Department," in his handwriting, the lectures he was to give on each day and their subjects. This "Record" shows the following item for October 3, 1859: "Law Department Inaugurated by an address from Professor Campbell on the 'Study of the law.'" Under date of October 5, in Professor Walker's hand, appears: "1st Lecture. Personal Property—What? 2nd Lecture. Contracts—Definition and Classification." The *Catalogue* of 1860 (p. 61) announced that the work was apportioned as follows:

FIRST YEAR

Professor Campbell—the Origin and History of Equity Jurisdiction; the General Heads of Equity Procedure, and Nature and Forms of Equitable Remedies; Criminal Law; the Laws of Evidence, and their Application in Legal Proceedings.

Professor Walker—Contracts; Title to Personal Property by Gift, Inheritance, Sale, Mortgage Assignment, and by Operation of Law; Bills of Exchange and Promissory Notes, and Commercial Law generally.

Professor Cooley—Estates in Real Property; Title to Real Property; Easements; the Domestic Relations; Wills, their Execution, Revocation and Construction.

SECOND YEAR

Professor Campbell—Some Special Heads of Evidence, and Equity Jurisprudence; Equity Pleading and Practice; Jurisprudence of the United States; Shipping and Admiralty.

Professor Walker—Agency; Bailments; the Law of Corporations; Common Law Pleading and Practice.

Professor Cooley—Constitutional Law; Partnership; Uses and Trusts; the Administration and Distribution of Estates of Deceased Persons.

A moot court presided over by the lecturer for the day was to be held at least once a week, and club courts were to be organized among the students.

Such was the course of instruction, followed with slight differences for a quarter of a century. After 1865 the assignments to individual professors were omitted from the *Catalogue*, and in 1882-83 appeared for the first time Actionable Wrongs, which in 1884-85 became Torts. This is curious, for the "Record" of the Department of Law shows that lectures had been delivered on this subject since January, 1869, and, strangely enough, by Kent, and not by Cooley, who in 1879 published his standard treatise on torts.

The *Calendar* of 1883-84 makes notable announcements. Change is in the air. The old faculty has lectured ably and has given the school a high standing. As it leaves it announces an "Improved and Extended Course of Instruction." The course has been extended to two years of nine months each. There is a "sincere

conviction that the standard of legal education should be raised." New subjects are added, recitations and examinations will be held, textbook work in the *Commentaries* of Blackstone and Kent is prescribed for juniors, with satisfactory written examinations thereon. Previously only seniors had been examined, and examinations had been oral. A record is to be kept, and seniors must pass satisfactory oral and written examinations on the lectures. Additional requirements are announced for admission to the department. A revolution is under way. The lecture system and the professor who is first of all an active practitioner or a judge are on the way out. Henry Wade Rogers, the first resident full-time professor, has arrived and has charge of the textbook work. It begins to be suggested that law students shall have textbooks at their rooms and shall use them. There has been no rule against a law student's working, but henceforth the faculty will check up on him to see what he is accomplishing.

In 1885-86 Harry B. Hutchins and in 1886-87 Jerome C. Knowlton were added as full-time professors, and another innovation appeared. Previously, part of the lectures had been given in odd years, the rest in even years, and seniors and juniors listened together. Thereafter, the course was graded, all the subjects were given each year, and juniors were not allowed to attend senior lectures. More subjects were added, both to the lecture and to the textbook courses. Students were to be examined on a "Study of Leading Cases."

In the next decade ten new men were added to the faculty, and they were resident, full-time men. There were fewer lectures and more recitation and textbook work, and there was a gradual appearance of collections of "Illustrative Cases" in various subjects. In 1895 the course was extended to three years, there

were more additions to the curriculum, and the completion of all the subjects was required for graduation. Even before this date all examinations were in writing.

At the time the Department of Law opened, law schools were criticized by lawyers as being too theoretical. The three professors who opened the Law Department were themselves office trained and were in a position to know. In their first announcement in the *Catalogue* of 1860 (p. 63) they pointed out:

The active practitioner, engrossed with the cares of business, cannot—or, at least, as proved by experience, does not—give to the students who place themselves in his charge, that attention and assistance essential to give a correct direction to their reading. . . . The effort here will be to make, not *theoretical* merely, but *practical* lawyers: not to teach principles merely, but how to apply them.

To this end they announced that they would conduct a moot court in which all students might participate, and that the faculty would assist the students in their club courts.

The moot courts were directed by the faculty, and from the first entry in the "Record of Law Department," October 13, 1859, Professor Cooley presiding, to June 7, 1893, moot courts were as regularly provided for as were lectures. But on September 25, 1893, it was recorded: "The Practice Court is to be under the charge of Professor Mechem." The moot court, which had existed so long without interruption, was displaced by the highly organized and faculty-directed practice court. This was intended to require of every senior participation in a jury case involving questions of fact and a case to be argued and disposed of as a question of law upon an agreed statement of facts. Papers and briefs were to be prepared and filed, and arguments were to be made as in an actual case in court.

The following year Thomas Ashford Bogle ('88) was added to the faculty to have entire charge of the practice court. He was assisted by the other members of the faculty, who sat as judges to hear the cases. Under his masterly direction the practice court was vigorously developed.

As further practical training for the actual work of the law office, a course in Conveyancing was arranged. In this course such papers were drafted by the students as would be expected to be called for in actual practice. James Henry Brewster (Sheffield Scientific School '77, LL.B. Yale '79) was called to devote his entire time to this work. By these and other means the Department of Law endeavored to keep good that early promise to make the work not theoretical merely, but practical as well.

The idea long persisted that the instruction could be made more practical by having a faculty of practicing lawyers and sitting judges. As previously noted, in 1882 a change began. The first full-time professor had had very little experience in practice. For another dozen years the full-time professors were in a minority, and the advantage of having lecturers engaged in practice was stressed in the departmental *Announcement*. Some objected to the practice court on the ground that the practical work could be done only in a law office. Professor Bogle's answer was: "We are doing it in the Law School."

On account of the rapidly expanding law, the effort to give instruction in all the subjects to all the students was breaking of its own weight. No student could profitably pursue so many studies, and in 1897 election courses were established, and each student was required to elect and complete three. These electives were given as courses of lectures, for the most part by practicing lawyers who were specialists in the various fields. Ten years later most of these special courses

were open to second- and third-year classes, but not required of them, and certain courses given by resident professors were made elective, each third-year student being required to complete one each semester.

With the induction in 1910 of Henry M. Bates ('90, LL.B. Northwestern '92, LL.D. Kalamazoo '25) as Dean, a change was made. Law had become so complex that a lawyer in a lifetime could not master every subject, and it was agreed that the student could be much better prepared for practice by the requirement of certain subjects as fundamentals and by more thorough courses in fewer subjects, which he might elect. The question became, not how much law he could learn but how well he could be trained to know how to find and to apply the law as he might need it in practice. Accordingly, in time most of the second- and third-year subjects were made elective. Coincident with these changes the number of class-hours was decreased and the work was made more intensive and extensive in each subject. First-year men, just entering a strange field, spent more hours in recitation so as to have greater aid from the instructor in becoming oriented. In the next two years students were thrown more on their own. It would require six years or more for a student to complete all the courses in the curriculum, but in the three-year course in law school it was believed that he would be better grounded in the law and its practice by doing better work in fewer subjects.

The summer session.—In 1895 a summer school of law was announced, with three courses given for six weeks by three instructors. The next year short review courses were offered in nearly all the principal subjects of the first and second years in law. The term was eight weeks. These courses were commended to students who wished to review as

preparation for examinations for admission to the bar or for advanced standing in the Department of Law. They also appealed to students who had been conditioned. The courses were announced as not in any sense equivalent to the corresponding courses given in the regular session.

Until 1904 the summer school was a private venture. The University furnished the building, collected fees, and paid the expenses. The balance was to pay the faculty. At first the attendance was small, the compensation slender. In 1904 the Board of Regents voted that the various summer schools should be operated under its direction and control as the Summer Session of the University of Michigan (see Part IV: SUMMER SESSION). The selection and salaries of the faculty were determined by the Regents as in the regular session. The attendance ranged from 25 in 1895 to 149 in 1909.

In 1910 the law summer session was extended to ten weeks, later to eleven, and the work offered in each subject was the same in character and amount as that given in the regular session. The effect of this was that three summers were equivalent to one year, and that by entering in a summer session it was possible for a student to graduate two years from the following September, saving practically a year of time. Many have done this, and in 1940 more than half of those enrolled were also students in the regular session. The summer session is really an extension of the regular session.

METHODS OF INSTRUCTION.—During the first twenty-five years the method of instruction in the Department of Law was simplicity itself. The professor lectured; the student listened. Late in the term there were occasional oral quizzes of the seniors, usually in part of the lecture hour. Juniors were not quizzed or examined. Each week there were ten lectures. At the end of the term there were

final examinations, oral only, of the seniors. A student of that day, who was afterward a member of the faculty, said that each senior was supposed to be asked a few questions, but the examination was largely a matter of form. No one was rejected. The men sat at the feet of great lawyers, learned men, and could learn much or little as they might elect. Graduation entitled them to admission to the bar. Other law schools of that date required no more, some less, and admission to the bar by the office route was easier still. There were few requirements. In the Department of Law there were the moot courts, and a written dissertation, or thesis, of not less than forty folios was required for graduation, "but no great stress was laid upon it."

With the second twenty-five years the textbook appeared. Instruction by lecture continued, but some courses were given by textbook, or by lectures and cases or textbook and cases, and toward the end of this second period sometimes by the study and discussion of cases alone, with running comment by the professor. In the third quarter-century of the Department of Law, since 1915 called the Law School, instruction by lecture or textbook rapidly disappeared and was largely, but not entirely, displaced by the so-called case method of instruction. To receive credit in the second and third periods of the School the student was required to pass written examinations in each subject pursued. These examinations at first were largely memory tests, but later became tests in legal reasoning on hypothetical cases involving principles of law in the subject. Cases form the basic material in developing the principles of law, and ability to apply legal principles to the ordinary controversies of life is the test by which preparation to enter the practice of the law is measured. Thus the Law School is "practical" by teaching the

law student how to use in practice the knowledge he has acquired in school.

Recently, there has been much discussion in the law schools about relating the law more closely to the present conditions of living, particularly in their social and economic aspects. Some schools have announced new approaches to the law and revised curriculums making specific provision for instruction in the law school by economists and sociologists who are not lawyers. The University of Michigan faculty has long recognized the problem of relating present-day law to the increasingly complex and ever-changing social and economic life. It has been felt, however, that the law student should secure the foundations of his economic and social background in his prelegal college work under the guidance of trained economists and sociologists. Then, when he enters upon the study of law, he will be prepared to study and understand the economic and sociological implications of every case. It is felt that this approach can best be directed by those who are primarily trained as law teachers, but who are fully awake to and informed as to the problems of society to which the law is to be applied, and in which it finds its reason for existence, rather than by instructors primarily trained in other branches who give separate courses in the Law School. The aim in the Law School is to treat the law and the life in which it operates, not as things separate and distinct, but as one, the law existing solely for the contribution it makes to the life to which it is applied. Every recitation hour, therefore, is devoted to the law, not as an isolated thing, but as part and parcel of the conditions for which alone its existence and form are justified. Every professor in every course is an instructor not only in law but also in such subjects as economics and sociology as well.

Graduate instruction.—The student was

formerly prepared to enter the practice of the law by work and observation of the law in action in a law office. He still does most of his graduate work, if any, in that manner. Today the school has almost entirely supplanted the office as a preparatory institution, but it has made slight inroads on the office for work following graduation. After eighteen or nineteen years at school the student is ready for a change, and once he is in successful practice he is not likely to leave it to return to school. Thus far, completion of a graduate course does not bring more attractive offers to enter practice.

The immense increase in enrollment in law schools, however, has brought the need for many more lawyers fitted to become teachers of law, and for that purpose legal scholarship is very important. Success at the bar has proved no criterion of promise as a law teacher. Successful practice is financially so much more remunerative than teaching that active practitioners are rarely willing to change, and very successful practitioners have often proved ill suited to the teaching of law, particularly so if they enter upon teaching after many years of practice. More and more, law faculties are recruited from lawyers with short experience at the bar, often with none at all, but with scholarly instincts and achievement. For the training of these there is a limited but growing demand for superior graduate work in law.

The first enrollments for graduate work were in the days of the two-year law course. In 1889 the Regents approved a study of one year after graduation leading to the degree of master of laws (LL.M.). Between 1890 and 1897 (the year in which the course was increased to three years) there were from six to twenty-one enrolled in this graduate year. Since that time enrollments have been few. This shows that several years before it was offered there was a

substantial demand for a three-year course. When three years of study were required for the bachelor of laws degree, the degree of master of laws almost disappeared. The course was little more than an added year of law study, though some specialization was required.

In 1924 a new fourth-year course (for the degree of master of laws or juris doctor, J.D.) was announced which was not merely an added year after graduation, but called for specialization and a different kind of work. For this, new courses were offered which were open only to fourth-year students. The next year this was modified so as to provide for two fourth-year curriculums (LL.M. and doctor of juridical science, S.J.D.). These two curriculums are still in force. To enter the former the student must have secured a law degree with high rank and must thereafter pursue a fourth-year program of study in this Law School approved by the committee on graduate law instruction. This program must provide for a substantial measure of specialization in some selected subject.

More worthy still of being dignified as graduate study is the course leading to the degree of doctor of juridical science (S.J.D.). The candidate must not only have the previous record required for the course leading to the degree of master of laws and pursue an approved program of graduate study for at least a year, but he must also demonstrate capacity for independent research in law by completing and preparing for publication an approved original study upon some selected subject. This study may be submitted at any time within five years after completion of the graduate year. This year must be devoted to pursuit of seminar courses open by special permission to a limited number of exceptionally qualified third-year and fourth-year students. This is graduate work calling for independent research which requires schol-

arly attainment. A considerable number, many of whom are graduates of other law schools, have elected this work every year since it was first offered.

THE LAW STUDENTS.—The student body of the Department of Law from the first was cosmopolitan. In the first year nine states and England were represented. Twenty-six of the ninety-two students were nonresidents of Michigan in that year; fifty-three of 134 the second year, representing thirteen states. There were large numbers from Ohio and Illinois, and some from most of the other Midwestern states. In 1861-62 fifty-eight of 129 students came from beyond the borders of Michigan, and ten years later only 115 of the 307 students enrolled in law were residents of Michigan. Some objections to providing training for non-Michigan men were met by the President and Dean Cooley with the statement that it cost no more to lecture to a larger group and that the fees of these nonresidents paid all the current expenses of the Law Department.

During the following years two-thirds of the students, sometimes slightly less, sometimes more, came from outside the state. In 1880-81 there were 112 students from Michigan, 259 from outside; in 1890-91, 165 and 416. In recent years Michigan students have constituted about half the total number. In 1934-35 270 students were from Michigan and 268 were from thirty-six states and four foreign countries. This situation serves as both cause and effect. Because the student body is cosmopolitan, instruction must be on broad lines and not confined to narrow local law. Because the law is broadly presented, this cosmopolitan body of students is attracted here. This condition is altogether favorable at once for the study of the law and for the best preparation for practice. Once through school the lawyer has a lifetime of study and practice of local law. He is

fortunate in his student days to be presented with the broader view taking in jurisdictions other than his own. Moreover, this association with such a student body, men from every state and from many foreign countries, in itself is part of a liberal education.

Student societies.—From the very beginning the students of the School have had voluntary organizations to promote activities which were of special interest or value to students of the law. The Webster Society dates almost from the opening of the department. It is said to have been founded early in October, 1859, with the co-operation of the faculty. The Jeffersonian Society followed soon after. These were literary and debating societies which held weekly meetings in rooms provided for them in the Law Building. For almost sixty years these societies flourished. When in 1887 a professor of elocution was appointed for the Department of Literature, Science, and the Arts (see Part IV: DEPARTMENT OF SPEECH), these law societies participated in the debating and oratorical contests held under his guidance. So keen was the interest that other societies—the Clay, Benton, Griffin, and Mechem—were formed to provide more active participation by a larger number.

As requirements for admission to the Law School were advanced to include preliminary college work, and especially after the Law School became a graduate department, the part these societies had played tended to be relegated to the college years, and in 1919 or 1920 the law societies died.

The case clubs.—To some extent, the place of the literary societies and the oratorical and debating contests has been taken by the case clubs, which were first organized in 1925. In the first year students may join one of four clubs. In each club teams of four are assigned a hypothetical case on which the students draw

papers and briefs as in an actual case in court. The work is supervised by members chosen from the third-year class who act as advisers and sit as judges to hear the arguments of each team and to decide the cases, each case being argued by two men on each side. In the second year, professors sit with third-year students to hear arguments in an elimination contest to select the four students who shall appear as attorneys in the finals. These are held on Founder's Day.

Honors and prizes.—The first prizes offered in the Law School were in the form of honors to those students standing highest in each third-year class. They were selected as student editors of the *Michigan Law Review*. They received not only this recognition, but also the valuable opportunity to prepare for publication studies of recent cases. Incidentally, they greatly improved their chances of finding positions in desirable offices on graduation. *Law Review* men are at a premium.

In 1912 the University of Michigan Department of Law joined with several other law schools in establishing the Order of the Coif, an honor society for law schools, whose members are chosen principally on the basis of scholarship (see Part IX: COIF).

The first monetary prize offered in the Law School was an award of the Howard B. Coblenz prize, paid from the income of a fund given by the parents of a member of the class of 1918 who lost his life in World War I. In 1925 a class of 1908 memorial scholarship was provided for by Guy B. Findlay of that class for the second-year student who in the previous year had attained the highest rank in his class.

The Henry M. Campbell case club award was established by the Detroit law firm of which Mr. Campbell, of the class of 1878, had been a member. It is awarded to the four men of the case clubs

who win through the preliminary contests and are chosen for the final argument on Founder's Day. Two-thirds of the prize goes to the two who win the final contest, the other third to the losers.

In 1928 the Regents established three fellowships with substantial stipends to assist graduates of outstanding ability to do graduate work and independent research. Other funds have been made available by the great gifts of William W. Cook to the Law School.

PUBLICATIONS.—The law class of 1894 began an "annual publication" called *To-Wit*. The classes of 1895 and 1896 continued it, but changed the name to *Res Gestae*. This contains considerable matter of historical interest. Judge Cooley contributed to *To-Wit* a very valuable article on "Founding of the Law Department of the University of Michigan," with fine appreciations of Professors Campbell and Walker. An appreciation of Judge Cooley was written by President Angell. *Res Gestae* of 1895 contains important addresses made at the unveiling of a bust of Judge Cooley, which had been given by the class. The principal speaker was a distinguished member of the New York bar, Mr. William B. Hornblower. One feature of the publication was an article by Judge Cooley on the Webster-Hayne debate in Congress, in which Judge Cooley proceeded to present his views of the nature of the Constitution. The *Res Gestae* of 1896 contains a tribute to Judge Campbell, then just deceased, by Judge Cooley, the last survivor of that great triumvirate, and an article by the new Dean, Harry B. Hutchins, on "The Law School of To-Day, Its Work and Functions." Such contributions are indeed *res gestae*.

Other publications deserving mention are *The Brief*, issued in 1925 by the first students who lived in the new Lawyers Club; *Addresses*, issued in 1925, at the dedication of the Lawyers Club; *The*

Lawyers' Quadrangle, published in 1931 when the William W. Cook Legal Research Library was completed; *Dedicatory Exercises, Law Quadrangle at the University of Michigan*, a book of illustrations published in 1934; and *Law Quadrangle*, 1934, containing the notable addresses at the dedicatory exercises after Hutchins Hall was finished.

The Michigan Law Review.—Increasingly in recent years the most valuable contributions to the law and its procedure have been made by scholarly studies which have been published as articles in legal journals. The demand for suitable vehicles for bringing such studies to public attention has been met to a large extent by law journals supported by the law schools. The *Harvard Law Review* appeared in 1887, the *Yale Law Journal* in 1891, the *Columbia Law Review* in 1901, and the *Michigan Law Review* in 1902. The last-named was under the editorship of the late Floyd Russell Mechem (A.M. hon. '94, LL.D. '12), Professor of Law, and the author of notable standard texts on various subjects of the law. He was assisted by the members of the law faculty and by ten students from the third-year class who acted as editorial assistants. The purpose was to give expression to the legal scholarship of the University and to serve the profession and the public by timely discussion of legal problems and by noting important developments in the field of jurisprudence.

The *Review* was made up of leading articles, comment on important cases and interesting legal subjects, notes on recent cases, and reviews of books and legal literature. The aim was to be practical and scholarly, and not so academic as to be out of touch with the legal profession. The *Law Review* has been edited, in turn, by Professors Mechem, Brewster, Holbrook, Drake, Stoner, Agler, Waite, and Shartel. Student edi-

tors chosen from the third-year classes on the basis of scholarship and proved aptitude for the work have written the comments and notes. The leading articles have been furnished not only by members of the faculty but also by law teachers from other schools and by scholars who are practicing lawyers, judges, and experts in various legal fields. Student editors have not infrequently produced work of such value as to be published as leading articles. More and more the contributions to the *Review* have been studied by lawyers and cited by judges. They have done much to lend impetus to the widespread present-day movements for the improvement of the law and of its practice and procedure.

FOUNDER'S DAY.—Each year since the completion of the first unit of the William W. Cook Quadrangle, the Law School (in Mr. Cook's honor) has set aside a day in April as Founder's Day. To the exercises of this day members of the bar are invited as guests. In the afternoon the final argument in the case club contest for the Henry M. Campbell case club award is the chief feature. In the evening a dinner in the dining hall of the Lawyers Club is attended by students and large numbers of lawyers, most of whom are alumni of the Law School. The dinner is followed by an address on some legal subject by a distinguished member of the bench or bar.

LEGAL RESEARCH.—Although research in law has always been an important field of work for members of the Law School faculty, the first definite and formal proposal to provide means for the systematic development of legal research was made in a letter to the Board of Regents, dated April 25, 1922, by a then anonymous donor who later was revealed as William W. Cook.

In that letter Mr. Cook stated that he proposed to erect a building to be known as the Lawyers Club. He said, further:

All dues and all profit from the operation of the building shall be used exclusively for legal research work, to be expended from time to time as the Governors may deem best. This legal research work will render possible the study of comparative jurisprudence and legislation, national and state, and also of foreign countries, ancient and modern. Such work should be of use in proposed legislation, and, besides leading to the production of reliable law treatises and studies, would help to systematize the law as a science. The European plan of giving leisure time to professors to pursue their studies and produce original works may well be applied in America to professors of law, who at present are absorbed too exclusively in class-room work. A legal research fund could be used to pay part of their salaries, thus giving them time for original research. (*R.P.*, 1920-23, p. 448.)

Research work on the Lawyers Club foundation began in 1927, when Edson Read Sunderland ('97, '01, LL.D. Northwestern '33) was appointed Professor of Law and Legal Research. Later, William Wirt Blume (Texas '20, Michigan '27, S.J.D. '28) was given a continuing research appointment. Others have received temporary appointments from time to time for the purpose of working out specific problems.

The first task undertaken with Lawyers Club funds was the revision of the legal procedure of the courts of Michigan. Soon after Professor Sunderland's appointment as Professor of Legal Research, he was made a member of the newly created Procedure Commission of the state, and became secretary and draftsman of the commission. A completely modernized system of procedure was prepared as a result of about two years of work, presented to the profession for criticism and suggestions, and finally put into operation by order of the Supreme Court under the title, "Michigan Court Rules, 1931."

As a result of this work Professor Sun-

derland was asked by the Chicago Bar Association to prepare a new and simplified system of procedure for the state of Illinois, and the Law School was in a position to enable him to devote a large part of his time for two years to this work. The new Practice Act was adopted in 1933 by the legislature of Illinois.

When the Supreme Court of the United States appointed an Advisory Committee in 1934 to draft new rules of practice for the federal courts, Professor Sunderland was made a member, and he was actively engaged in that work for nearly three years.

In 1929 the legislature of Michigan created the Judicial Council, to make a continuous study of the administration of justice in the state and to suggest to the legislature and to the Supreme Court, from time to time, such changes as might be deemed advisable. No appropriation was made for the council, and it was understood that responsibility for making the necessary studies and publishing the reports would be assumed by the Law School as a part of its research program. Professor Sunderland has been secretary of the Judicial Council from the beginning, and has published six annual reports, each containing a statistical presentation of the work of the courts of the state during the year, together with some special legal study, all financed out of Law School research funds. Among these special studies have been *Condemnation Procedure*, by Roy R. Ray (1931), *Discovery Procedure*, by George Ragland (1932), *Organization and Operation of Courts of Review*, by Edward O. Curran and Edson R. Sunderland (1933), *Declaratory Judgments—Their Availability in Different Types of Controversies*, by Edson R. Sunderland (1934), *The Office of the Friend of the Court in Wayne County*, by Frank E. Cooper and John P. Dawson (1935), and *Pre-trial Procedure in Wayne County*, by Frank E.

Cooper (1936). These studies have attracted wide attention. *Discovery Procedure*, in an enlarged and revised form, was published as a book by the Law School, and has become recognized as the leading American treatise on the practical use of discovery before trial.

Historical studies have taken an important place in the research program of the Law School. An extraordinarily valuable mass of documents was discovered in Lansing consisting of records and files of the Supreme Court of the Territory of Michigan and of the early state Supreme Court. They cover the period from 1805 to 1860. Professor Blume devoted several years to examining and classifying this material, which includes some three thousand original files, and he selected and edited the documents which are of special historical value for the light they throw upon the character of the judicial business transacted by those courts and the manner in which it was done. Four large volumes prepared by Professor Blume have been published by the Law School under the title *Transactions of the Supreme Court of the Territory of Michigan, 1805 to 1814*.

A study of English chancery decrees of the sixteenth century was made by Professor John P. Dawson ('22, J.D. '24, D. Phil. Oxford '30). During the second semester of 1936-37, Professor Dawson was engaged, while on sabbatical leave in England, in completing this study.

Research funds have also been made available for a number of other projects of more or less extended scope. Paul Gerhart Kauper (Earlham '29, J.D. Michigan '32), now a member of the Law School faculty, spent the year following his graduation in a research study of the

regulation and taxation of motor carriers, under the direction of Professor E. Blythe Stason. Seven extensive papers giving the results of this study have been published in the *Michigan Law Review*. William Warner Bishop, Jr. ('28, J.D. '31), devoted a year to research work in international law under the direction of Professor Edwin DeWitt Dickinson (Carleton '19, Ph.D. Harvard '18, J.D. Michigan '19), which consisted in editing the Spanish-American cases for the *International Law Digest* published by the University of London.

The text of the American Law Institute's restatement of the law of contracts has been annotated with Michigan citations, in order to make it more useful to the courts and lawyers of Michigan. Professor Grismore has had charge of this work.

Invaluable work in collecting and editing materials for the use of students in a number of branches of the law has been made possible by allocations of research funds to various members of the Law School faculty. Nothing is more essential to effective teaching of modern law than the constant revision of materials for study, in order that work in the classroom may be closely correlated with the continuous changes in the body of the law and its application to new problems. The labor involved in this process of continual modernizing of teaching material is enormous, and the success of the Law School in maintaining its high standing for legal scholarship is due in no small degree to the availability of funds for this purpose.

EDWIN C. GODDARD*

* Died August 14, 1942.

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